

## VPDES PERMIT FACT SHEET

This document gives pertinent information concerning the reissuance of the VPDES permit listed below. This permit is being processed as a major, municipal permit. The effluent limitations contained in this permit will maintain the Water Quality Standards of 9 VAC 25-260 et seq. The discharge results from the operation of a wastewater treatment facility that serves the City of Emporia and surrounding commercial area. This permit action consists of updating Part I limitations, monitoring requirements and special conditions. SIC Code: 4952

1. Facility Name and Address: Emporia Wastewater Treatment Plant  
500 Tall Oaks Drive  
Emporia, VA 23847
2. Permit No. VA0020346  
Existing Permit Expiration Date: May 13, 2012
3. Owner: City of Emporia  
Owner Contact Name: James L. Epps  
Title: Superintendent of Wastewater Treatment  
Telephone No: (434) 634-5682  
Address: P.O. Box 511  
Emporia, VA 23847
4. Application Complete Date: February 13, 2012  
  
Permit Drafted By: Janine Howard Date: 2/9/2012  
Piedmont Regional Office  
Reviewed By: Jeremy Kazio Date: 3/6/2012  
Curt Linderman Date: 3/16/2012  
Kyle Winter Date: 3/30/2012  
  
Public Comment Period Dates: 4/22/12 to 5/22/12
5. Receiving Stream Name: Meherrin River  
River Mile: 5AMHN050.90  
Basin: Chowan River and Dismal Swamp  
Subbasin: Chowan  
Section: 3  
Class: III  
Special Standards: None  
  
7-Day, 10-Year Low Flow (7Q10): 12 MGD  
1-Day, 10-Year Low Flow (1Q10): 4.9 MGD  
30-Day, 5-Year Low Flow (30Q5): 26 MGD  
30-Day, 10-Year Low Flow (30Q10): 18 MGD  
Harmonic Mean Flow (HM): 93.1 MGD  
High flow 1Q10: 64 MGD  
High flow 30Q10: 164 MGD  
Tidal? NO  
On 303(d) list? YES

See **Attachment A**- Flow Frequency Memorandum

6. Operator License Requirements: The recommended attendance hours by a licensed operator and the minimum daily hours that the treatment works should be manned by operating staff are contained in the Sewage Collection and Treatment Regulations (SCATS) 9 VAC 25-790-300. A **Class II** licensed operator is required for the facility.
7. Reliability Class: Reliability is a measurement of the ability of a component or system to perform its designated function without failure or interruption of service. The reliability classification is based on the water quality and public health consequences of a component or system failure. The permittee is required to maintain **Class I** Reliability for the existing facility.
8. Permit Characterization:  
☐ Private      ☐ Federal      ☐ State      ☒ POTW      ☐ PVOTW  
☐ Possible Interstate Effect      ☐ Interim Limits in Other Document
9. Provide a brief description of the wastewater treatment system.

OUTFALL NUMBER	DISCHARGE SOURCE	TREATMENT	DESIGN FLOW
001	Residential (90%) and commercial	Screening, grit removal, extended aeration (2X oxidation ditch), clarification (2X clarifiers), UV disinfection, aeration	1.5 MGD

The City of Emporia Wastewater Treatment Plant is a major municipal facility with a design flow of 1.5 MGD. The facility is located at 500 Tall Oaks Drive in Emporia, Virginia, sits on about 55 acres and is bounded on the south and east by Falling Run Creek, a tributary of the Meherrin River. The facility serves a population of approximately 5,927 persons with 2,500 connections. The plant primarily treats domestic wastewater, with one industrial connection (Georgia Pacific). The WWTP is comprised of a 22-acre sludge lagoon, administrative/laboratory buildings, screening and grit removal, oxidation ditches, and two clarifiers.

See **Attachment B**- Plant Flow Diagram

10. Sewage Sludge Use or Disposal:  
 Historically the facility disposed of its sludge in the sludge lagoon. In May 2005 a Siemens Water Technologies Corp. "Cannibal" Solids Reduction System was installed at the facility. The Cannibal system was designed to significantly reduce the amount of sludge produced at the plant (formerly around 52 dry metric tons per year). Following installation of the Cannibal, the permittee had planned to suspend the use of the lagoon for sludge disposal but retain the structure as an emergency equalization basin. However, the Cannibal system has not performed as well as expected and while it has reduced the amount of waste solids, the reduction has not been as significant as was anticipated. To date, approximately 38.5 dry metric tons of sludge are produced annually at the plant and sludge continues to be disposed of in the 22-acre sludge lagoon. Additionally, grit that is collected in the screening system is diverted directly to the sludge lagoon. Sludge from the clarifiers is occasionally drained to the sludge lagoon during routine maintenance. The municipality continues to work with the manufacturer to fine tune the Cannibal system with the aim of improving its efficiency. Once the system is fully operational, it is anticipated that the small amount of waste sludge from the Cannibal will be land-filled.
11. Discharge Location Description: This facility discharges to the Meherrin River.

Name of USGS topographic map: Emporia Quadrangle (8A)

See **Attachment C-** Topographic Map, Emporia Quadrangle (8A)

12. Material Storage: A caustic tank is located at the headworks of the plant and is utilized to adjust the pH of the wastewater as needed. The feed is automatically controlled via a pH probe. The tank is surrounded by a large containment wall to prevent any potential spill or leak from reaching state waters. In the event of a leak, a sump pump directs the liquids to the head of the treatment works. No other chemicals are permanently stored at the facility.

The facility applied for No Exposure Certification (NEC) concurrent to their VPDES permit application. The facility was formerly covered under NEC, however the certification expired on 3/2/2008. A site visit was performed on 11/9/2011 by Janine Howard and Meredith Williams. All permanently used chemicals are stored under cover or with secondary containment and NEC was recommended. During the 11/9/11 site visit, the facility was temporarily adding polymer to the oxidation ditches to aid in settling of fine ashy particulates which had caused an upset at the plant (refer to **Attachment D** Site Inspection Report and Compliance Inspection Report for details on the upset). Due to the temporary and urgent nature of the polymer addition, secondary containment was not provided however the barrels were sealed while in use. On 12/7/11 the permittee notified DEQ that polymer addition was no longer occurring at the facility and on 2/7/12 the permittee verified that the empty polymer barrels had been removed from the premises.

The NEC application was processed on March 16, 2012 and NEC was granted effective through November 20, 2016. Refer to **Attachment M** for a copy of the NEC notice of exclusion from VPDES storm water permitting.

See **Attachment D-** Site Inspection Report

13. Ambient Water Quality Information

The Emporia Wastewater Treatment Plant discharges to the Meherrin River in Emporia, VA. The discharge is located at rivermile 5AMHN050.90.

The VDEQ has operated a continuous record gage on the Meherrin River at rivermile 5AMHN052.34 in Emporia, VA (#02052000) since 1951. The gage is located at the Route 301 bridge, approximately 1.3 mile upstream of the discharge point. The flow at the gage is regulated by a hydropower plant located 0.8 mile upstream; therefore only flow frequencies at the gage during the regulated period of record after April 1986 were used. Due to the proximity of the gage and the discharge, the flows can be assumed to be equal. Flow, hardness, pH and temperature data from this record gage station were used to characterize the receiving stream for the purpose of effluent limitation development.

14. Antidegradation Review & Comments: Tier 1   X   Tier 2        Tier 3

The State Water Control Board's Water Quality Standards includes an antidegradation policy (9 VAC 25-260-30). All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The receiving stream is considered a Tier 1 water. The river experiences periods of low dissolved oxygen and is currently impaired for the Aquatic Life Use. Antidegradation was not applied during the 1988 modeling effort.

15. Site Inspection: Date: November 9, 2011      Performed by: Janine Howard, Meredith Williams, Megan Hayes

See **Attachment D**- Site Inspection Report and Compliance Inspection Report

16. Effluent Screening & Limitation Development:

Numeric permit limitation calculations utilize conservative low flow ambient conditions to represent circumstances in which the effluent has the greatest potential to impact the receiving stream. The receiving stream (Meherrin River) conservative low flows are listed in Item 5 of the fact sheet. Mix.exe was used to determine appropriate mix ratios; a complete mix (100%) assumption for the 7Q10 and 30Q10 flows, and 73.93% of the 1Q10 flow is available for mixing. See the Mix.exe printout in **Attachment G**. Ambient water quality data from monitoring station 5AMHN052.34 were used to characterize the receiving stream pH, temperature, and hardness (see fact sheet item 13 and **Attachment E** for more information and ambient water quality data).

Average effluent hardness was reported on the permit application and the 90<sup>th</sup> percentile of the effluent temperature was calculated from three years of temperature data (2009-2011) provided by the permittee. The 90<sup>th</sup> and 10<sup>th</sup> percentile maximum pH values were calculated using DMR data. The effluent and receiving stream data was then entered into an Agency spreadsheet termed "MSTRANTI" which calculates the maximum wasteload allocations (WLA) for each water quality parameter that will maintain the Water Quality Standards (WQS) in the receiving stream and protect against acute and chronic toxicity.

Water Quality Criteria Monitoring submitted with the application was used to screen the effluent for pollutants of concern. Pollutants that tested below the minimum Agency prescribed quantification level (QL) were considered absent for the purpose of this evaluation and no further analysis was required. Pollutants which were reported in measurable quantities, and those test results in which an unacceptable QL was used, were evaluated for a reasonable potential to violate the standard using Stats.exe and the appropriate WLA calculated by MSTRANTI.

See **Attachment F** for effluent DMR data and Water Quality Criteria Monitoring data.

Measureable concentrations (above or equal to the minimum Agency QL) of the following pollutants were identified in the effluent: dissolved cadmium, dissolved copper, dissolved lead, dissolved nickel, dissolved zinc, and chlorides. A reasonable potential analysis was performed on each of these parameters and no limitations are required.

Total recoverable selenium was reported as less than the quantification level used by the laboratory, however for this parameter the laboratory QL was greater than the Agency QL. For this reason the parameter was treated as present at a concentration equal to the lab QL for the purpose of evaluating the need for a permit limitation. Again, a reasonable potential analysis was performed and no limitation is needed. Similarly, dissolved silver was reported on the application as <0.5 µg/L, above the agency QL of 0.20 µg/L. As such, the parameter was considered present as a concentration equal to the lab QL for the purpose of the reasonable potential analysis. No limit for silver is needed.

Ammonia-N is a known constituent of domestic wastewaters and it is standard practice to perform a reasonable potential analysis on this parameter irrespective of the concentration

reported on the application (less than QL in this instance). In accordance with GM00-2011 an expected concentration of 9.0 mg/L was utilized for the reasonable potential analysis and no limit is needed for this parameter.

See **Attachment G** for Mix.exe results, MSTRANTI data source report, and MSTRANTI printout.

See **Attachment H** for Stats.exe results.

**Table 1.** Basis for Effluent Limitations

PARAMETER	BASIS FOR LIMIT	DISCHARGE LIMITS			
		MONTHLY AVERAGE	WEEKLY AVERAGE	MINIMUM	MAXIMUM
pH	3, 4	NA	NA	6.0 SU	9.0 SU
BOD <sub>5</sub>	1, 4	30 mg/L	45 mg/L	NA	NA
Total Suspended Solids (TSS)	2, 4	30 mg/L	45 mg/L	NA	NA
Dissolved Oxygen (DO)	1, 3	NA	NA	5.0 mg/l	NA
<i>E. coli</i> (N/100mL) (Geometric Mean)	3	126	NA	NA	NA
Toxicity, Acute (TU <sub>a</sub> ) [ <i>C. dubia</i> ] (Final)	5	NA	NA	NA	1.02
Toxicity, Acute (TU <sub>a</sub> ) [ <i>P. promelas</i> ] (Final)	5	NA	NA	NA	1.02

1. Stream Sanitation Memorandum (8/9/1988) (**Attachment I**)
2. Best Engineering Judgment (BEJ)
3. State Water Quality Standards (effective 1/6/11)
4. Federal Effluent Guidelines for Secondary Treatment (40 CFR 133.102)
5. Water quality based effluent limitation

NA = Not Applicable

Dissolved oxygen and BOD<sub>5</sub>:

These limitations are based on the 1988 modeling effort discussed in **Attachment I**.

Additionally, the numeric criteria for dissolved oxygen per 9VAC25-260-50 for Class III waters is 5.0 mg/L.

*E. coli*:

All sewage discharges must be disinfected to achieve applicable bacterial concentrations in accordance with the Virginia Water Quality Standards, 9 VAC 25-260-170. Per the VPDES permit manual Section MN-3, *E. coli* is used as the disinfection indicator parameter for facilities that utilize alternative disinfection (ultraviolet) and discharge to fresh water. The monitoring frequency for this parameter is therefore determined by the VPDES Permit Manual Section MN-2 A.4 sampling schedule table, bacteria (alternate disinfection) and is set at five days per week.

pH: 9 VAC 25-260-50 of the VA Water Quality Standards outlines numerical criteria for pH in Class III waters between 6.0 S.U. and 9.0 S.U.

Total Suspended Solids (TSS):

The TSS limitation is a best engineering judgment carried forward from the 2007 permit. It is standard practice to set the TSS limitations equal to the BOD<sub>5</sub> permit limitations and it is likely that this is how the TSS permit limit concentrations were originally designated.

Whole Effluent Toxicity (WET): The 2012 permit includes an acute toxicity limit for both *C. dubia* and *P. promelas*. Refer to **Attachment L** WET memorandum and supporting documents for detailed information. A four year schedule of compliance is afforded, prior to the limitation becoming effective. The permittee is encouraged to undertake voluntary monitoring in the interim to aid in preparation of required annual progress reports (Part I.D) and determination of the steps needed to comply with the eventual limitation.

Human Health Evaluation:

Separate human health (HH) standards apply to waters that are designated as “Public Water Supplies (PWS)” and “all other surface waters.” The receiving stream is not designated as a PWS; consequently, the HH (PWS) standards are not applicable to this discharge. By letter dated February 10, 2012 VDH confirmed that there are no public water supply intakes within 15 miles downstream of the discharge.

Although the receiving stream is not a PWS, each parameter found in the effluent at a measureable concentration or a concentration above the Agency QL is listed in Table 2, below, and compared with the applicable Human Health (PWS) wasteload allocation for this discharge.

**Table 2.** Human Health Evaluation

Parameter	Human Health WLA (PWS)	Effluent Concentration	Exceed Human Health WLA
Cadmium (µg/l)	92	0.33	NO
Chlorides (µg/l)	$4.6 \times 10^6$	$67.9 \times 10^3$	NO
Copper (µg/l)	24000	5.6	NO
Lead (µg/l)	280	0.5	NO
Nickel (µg/l)	11000	2.3	NO
Selenium	3100	<5.0	NO
Silver	N/A	<0.5	N/A
Zinc (µg/l)	140000	47	NO

As indicated in Table 2, the parameters found in measurable concentrations in the effluent do not present a reasonable potential to cause or contribute to a human health concern. No further evaluation is necessary.

17. Basis for Sludge Use & Disposal Requirements:

Not applicable, as this facility does not land apply sludge. See Item 10 for further details on sludge use and disposal.

18. Antibacksliding Statement:

No limits have been reduced or removed during this permit reissuance.

19. Compliance Schedule: The 2012 permit includes an acute toxicity limit for both *C. dubia* and *P. promelas*. A four year schedule of compliance is afforded for the permittee to meet this limit. Refer to Part I.D. of the permit and **Attachment L** for the Whole Effluent toxicity evaluation.

20. Special Conditions:

**Part I. B.1: 95% Capacity Reopener**

**Rationale:** Required by VPDES Permit Regulation, 9VAC25-31-200 B 4 for all POTW and PVOTW permits.

**Part I. B.2: Indirect Dischargers**

**Rationale:** Required by VPDES Permit Regulation, 9VAC25-31-200 B 1 and B 2 for POTWs and PVOTWs that receive waste from someone other than the owner of the treatment works.

**Part I. B.3: CTC, CTO Requirement**

**Rationale:** Required by Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9 VAC 25-790.

**Part I. B.4: Reliability Class**

**Rationale:** Required by Sewage Collection and Treatment Regulations, 9VAC25-790 for all municipal facilities.

**Part I. B.5: Licensed Operator Requirement**

**Rationale:** The VPDES Permit Regulation, 9VAC25-31-200 C and the Code of Virginia § 54.1-2300 et seq, Rules and Regulations for Waterworks and Wastewater Works Operators (18VAC160-20-10 et seq.), require licensure of operators.

**Part I. B.6: Sludge Reopener**

**Rationale:** Required by VPDES Permit Regulation, 9VAC25-31-220 C for all permits issued to treatment works treating domestic sewage.

**Part I. B.7: Sludge Use and Disposal**

**Rationale:** VPDES Permit Regulation, 9VAC25-31-100 P; 220 B 2; and 420 through 720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on sludge use and disposal practices and to meet specified standards for sludge use and disposal.

**Part I.B.8: Groundwater Monitoring**

**Rationale:** State Water Control Law § 62.1-44.21 authorizes the Board to request information needed to determine the discharge's impact on State waters. Ground water monitoring for parameters of concern will indicate whether possible lagoon seepage is resulting in violations of the State Water Control Board's Ground Water Standards. Surface water monitoring of the receptor of the groundwater plume will indicate whether possible lagoon leakage is impacting State surface waters and resulting in violations of the State Water Quality Standards.

See **Attachment K** for the 2011 Groundwater Monitoring Evaluation. Continued groundwater and surface water (receptor) monitoring in accordance with the approved Groundwater Monitoring Plan (3/23/87) and approved Corrective Action Plan Phase I and II (4/24/08 and 2/6/09) is required by the 2012 permit.

**Part I. B.9: Total Maximum Daily Load (TMDL) Reopener**

**Rationale:** Section 303(d) of the Clean Water Act requires that total maximum daily loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The re-opener recognizes that, according to section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under section 303 of the Act.

**Part I. B.10: Operations and Maintenance Manual Requirement**

**Rationale:** Required by Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9 VAC 25-790; VPDES Permit Regulation, 9VAC25-31-190 E.

**Part I. B.11: Compliance Reporting**

**Rationale:** Authorized by VPDES Permit Regulation, 9VAC25-31-190 J 4 and 220 I. This condition is necessary when pollutants are monitored by the permittee and a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. The condition also establishes protocols for calculation of reported values.

The QLs for BOD<sub>5</sub>, TSS are Agency prescribed. The BOD<sub>5</sub> QL was reduced from 5.0 mg/L to 2 mg/L in accordance with recently adopted General Permit regulations.

**Part I. B.12: Closure Plan**

**Rationale:** Code of Virginia § 62.1-44.19 of the State Water Control Law. This condition establishes the requirement to submit a closure plan for the wastewater treatment facility if the treatment facility is being replaced or is expected to close.

**Part I. B.13: Materials Handling/Storage**

**Rationale:** 9 VAC 25-31-50 A prohibits the discharge of any wastes into State waters unless authorized by permit. Code of Virginia § 62.1-44.16 and 62.1-44.17 authorizes the Board to regulate the discharge of industrial waste or other waste.

**Part I. B.14 Pretreatment**

**Rationale:** VPDES Permit Regulation, 9VAC25-31-730 through 900, and 40 CFR Part 403 require certain existing and new sources of pollution to meet specified regulations.

**Part C. Whole Effluent Toxicity (WET) Testing**

**Rationale:** VPDES Permit Regulation, 9 VAC 25-31-210 and 220 I, requires monitoring in the permit to provide for and assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act. (See **Attachment L**)

**Part D. Schedule of Compliance for WET Limitations**

**Rationale:** 9VAC 25-31-250 allows for schedules of compliance, when appropriate, which will lead to compliance with the Clean Water Act, the State Water Control Law and regulations promulgated under them.

**Part II, Conditions Applicable to All Permits**

**Rationale:** VPDES Permit Regulation, 9VAC25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.

21. Changes to Permit:

Changes to Permit Cover Page:

Cover page Boilerplate verbiage revised per January 27, 2010 VPDES Permit Manual, Section MN-1. Facility location updated to reflect the address given in the application (500 Tall Oaks Drive). The previous address (100 Briggs Street Ext.) was not mapped and was not a valid postal address. The City renamed the road so that the facility now has a standardized U.S. Postal Service address.

**Table I.** Changes to Part I. A Effluent Limits and Monitoring Requirements:

Parameter Changed	Monitoring Requirement Changed		Effluent Limits Changed		Reason for Change:
	From	To	From	To	
BOD <sub>5</sub>	3/Week	5 Days per week	No change	No change	Reduced monitoring not applicable due to enforcement action (refer to fact sheet section 25, staff comment a.)
Toxicity, Acute (TU <sub>a</sub> ) [ <i>C. dubia</i> ] (Final)	---	1 per Quarter	---	1.02	WET evaluation indicated the need for a permit limitation based on acute toxicity.
Toxicity, Acute (TU <sub>a</sub> ) [ <i>C. promelas</i> ] (Final)	---	1 per Quarter	---	1.02	WET evaluation indicated the need for a permit limitation based on acute toxicity.
<b>Other Changes</b>	<b>From</b>	<b>To</b>	<b>Change:</b>		
NL, NA definitions	NL= NA=	NA means... NA means...	Definitions written out and clarified		
24HC	---	24HC means...	Definition of 24HC added for clarity.		
Footnote	a.	Part I.A.1	Incorporated into Part I.A.1 statement.		
Footnote	(1)	Deleted	Not needed. Units incorporated into the limitations page and associated directly with each parameter.		
Footnote	(2)	a.	Design flow updated to two significant digits (1.5 MGD). "TIRE" definition removed as it is spelled out in table. Citation to Part I.B.1 added.		
Footnote	(3)	b.	Relabeled.		
Footnote	(4)	Deleted	Not needed, geometric mean specified in the limitations table.		
Footnote	b.	Part I.A.2	Formatting change, relabeled.		
Footnote	c.	Part I.A.3	Changed to clarify that effluent samples should be taken post –aeration.		
Footnote	d.	c.	Citation to Part I.B.11 QLs and reporting requirements updated and relabeled.		
Footnote	e.	Part I.A.4	Relabeled and BOD clarified to read BOD <sub>5</sub> .		
Footnote	---	d.	Citation to WET special condition added for clarity.		

Footnote	---	e.	Citation to Schedule of Compliance added for clarity.
Footnote	---	f.	Added to define quarterly monitoring periods for the WET limitation.

**Table II.** Changes to Permit:

<b>From:</b>	<b>To:</b>	<b>Reason/Change:</b>
Part I. B.1 95% Capacity Reopener	Part I. B.1 95% Capacity Reopener	Language update per 8/25/11 edition VPDES Permit Manual
Part I. B.2 Indirect Dischargers	Part I. B.2 Indirect Dischargers	Language update to replace "Department" with "DEQ Piedmont Regional Office" for clarity.
Part I. B.3 CTC, CTO Requirement	Part I. B.3 CTC, CTO Requirement	Language update per 8/25/11 edition VPDES Permit Manual
Part I. B.4 Reliability Class	Part I. B.4 Reliability Class	No change
Part I. B.5 Licensed Operator Requirement	Part I. B.5 Licensed Operator Requirement	No change
Part I. B.6 Sludge Reopener	Part I. B.6 Sludge Reopener	No change
Part I. B.7 Sludge Use and Disposal	Part I. B.7 Sludge Use and Disposal	Language update in accordance 8/25/11 edition VPDES Permit Manual
Part I. B.8 Groundwater Monitoring	Part I. B.8 Groundwater Monitoring	Language update per 8/25/11 edition VPDES Permit Manual and PRO edits appropriate to the situation
Part I. B.9 TMDL Reopener	Part I. B.9 TMDL Reopener	No change
Part I. B.10 O&M Manual Requirement	Part I. B.10 O&M Manual Requirement	Language updated in accordance with the 4/2/12 revised language distributed by Central Office
Part I. B.11 Water Quality Criteria Monitoring	Deleted	No longer needed because Attachment A is now submitted with the permit application
Part I.B.12 Compliance Reporting	Part I.B.11 Compliance Reporting	Renumbered and language update per 8/25/11 VPDES Permit manual.
----	Part I.B.12 Closure Plan	Added per 8/25/11 edition VPDES Permit Manual
Part I.B.13 Material Storage and Handling	Part I.B.13 Material Handling and Storage	Updated per 8/25/11 edition VPDES Permit Manual
Part I.B.14 Effluent Monitoring Frequencies	Deleted	Reduced monitoring is no longer applicable due to enforcement action within the last three years
Part I.C. Pretreatment Program	Part I.B.14 Pretreatment	Language update per 8/25/11 edition VPDES Permit Manual and PRO edits
Part I. D. WET Testing	Part I. C. WET testing	Language update per TMP memo (Attachment L) in coordination with Central Office (D. Debiasi) and PRO edits

From:	To:	Reason/Change:
---	Part I.D. Schedule of Compliance	Added due to the new WET limitation in Part I.A.

Changes to Part II: Part II.A.4 added to address the Virginia Environmental Laboratory Accreditation Program (VELAP) requirements. The addition was made in accordance with the 7/19/11 WPM email and Central Office guidance.

- 22. Variances/Alternate Limits or Conditions: None
- 23. Regulation of Users: 9VAC25-31-280 B 9: Not applicable, this facility is a POTW.
- 24. Public Notice Information required by 9VAC25-31-280 B:

Comment period: 4/22/12- 5/22/12

Date of first publishing: 4/22/12

Date of second publishing: 4/29/12

Publishing Newspaper: *The Independent- Messenger*

All pertinent information is on file and may be inspected, and copied by contacting Janine Howard at Virginia DEQ-Piedmont Regional Office, 4949-A Cox Road, Glen Allen VA 23060, (804) 527-5046, e-mail Janine.howard@deq.virginia.gov.

HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments and requests for public hearing by e-mail, fax or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. A public hearing may be held, including another comment period, if public response is significant, based on individual requests for a public hearing, and there are substantial, disputed issues relevant to the permit. The public may review the draft permit and application at the DEQ office named above by appointment or may request copies of the documents from the contact person listed above.

#### Public Notice Comments:

No public comments were received during the public notice period. The draft permit package has not changed as a result of public comments.

Following the public notice period, DEQ made a staff initiated administrative change to Part I.C.4, the Reporting Schedule section of the Whole Effluent Toxicity special condition. The phrase "with the DMR" was removed from the first line of this special condition. This phrase was removed as it contradicts DEQ's expectation that only DMR related documents are to be uploaded and submitted to the agency via e-DMR. The permittee was notified and raised no objection to the change. Due to the change being administrative in nature and in no way making the permit less stringent, the permit was not sent to public notice a second time.

25. Additional Comments:

Previous Board Action: None

Planning Statement: This discharge is in conformance with the existing planning documents for the area (J. Palmore, 3/20/12)

Staff Comments:

- a. This facility was issued a Warning Letter on October 27, 2011, followed by a Notice of Violation on December 8, 2011 for TSS and *E. coli* permit limitation exceedances. Due to this enforcement action, the facility is not eligible for reduced monitoring consideration at this time. Reduced monitoring (three days per week) for BOD<sub>5</sub> was applied in the 2002 permit, however due to the enforcement action within the last three year period, BOD<sub>5</sub> monitoring frequency is reset to the baseline monitoring frequency of five days per week in the 2012 permit. As such, the effluent monitoring frequencies (Part I.B.14 in the 2007 permit) special condition is not included in the 2012 permit.
- b. The 2011 permit fees for this facility were paid on 9/27/2011.
- c. This discharge is not controversial. The facility is currently under enforcement for TSS and *E. coli* exceedances for the months of October and November. These exceedances are associated with the upset, described in the site visit memo and Compliance Inspection memo by Meredith Williams (**Attachment D**). A Notice of Violation was issued on December 8, 2011.
- d. The facility is not a member of the Virginia Environmental Excellence Program (VEEP).
- e. The permittee has been notified of the requirement to register for DEQ's e-DMR program on 11/15/2010 and 6/2/2011. The e-DMR registration form was received on March 13, 2012. Due to an e-DMR database complication, the e-DMR administrator is unable to register the facility for e-DMR submittals at this time. Therefore, a hard copy DMR will be provided with the 2012 permit package. If at a later date the facility's e-DMR application is processed, the facility will be notified of the expectation to submit DMRs electronically at that time.
- f. This facility is not required to register for coverage under 9 VAC 25-151 General VPDES Permit VAR05 for Discharges of Storm Water Associated with Industrial Activity (Sector T) due the issuance of No Exposure Certification on March 16, 2012. Refer to **Attachment M** for the NEC notice letter.
- g. The facility is not required to register for coverage under 9 VAC 25-820-10 et seq.- General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia. The facility does not discharge into the Chesapeake Bay Watershed and is not listed in the Chesapeake Bay TMDL.

Threatened and Endangered Species Coordination:

As required by the 2007 Memorandum of Understanding (MOU) between VDEQ, VDGIF (Virginia Department of Game and Inland Fisheries), VDCR (Virginia Department of Conservation and Recreation), and USFWS (United States Fish and Wildlife Service), a threatened and endangered species screening was conducted for this permit reissuance. The T&E review was performed in accordance with GM 07-2007.

A request for review was submitted to DCR via the Natural Heritage Explorer webpage and a report was generated on 7/15/2011. The report indicated that "Natural heritage resources have been documented within two miles of the indicated project boundaries." A subsequent response was received on August 8, 2011 stating that the Meherrin River Stream Conservation Unit (SCU) is in the vicinity of the discharge. SCUs identify stream reaches that contain aquatic natural heritage resources, and include two miles upstream and one mile downstream of any documented resources and any tributaries within the reach. The species of concern within the SCU are the yellow lampmussel, green floater, yellow lance, and Roanoke slabshell. DCR recommended the use of UV or ozone disinfection as opposed to chlorination to minimize the impacts to aquatic resources. DCR also recommended coordination with VDGIF. Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (DCR), DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. DCR stated that the current activity will not affect any documented state-listed plants or insects. A response was provided to DCR on 9/16/11, indicating that UV disinfection is already utilized at this plant and that coordination with VDGIF had been initiated. No further coordination with DCR is necessary.

A T&E species screening was conducted using VDGIF's Fish and Wildlife Information Service for aquatic species. The green floater, listed as state threatened, was confirmed within a two mile radius of the outfall. Formal coordination with VDGIF was initiated on 9/16/2011. A written response was received on 11/3/2011, indicating that VDGIF do not anticipate that the reissuance of the permit will result in an adverse impact to designated potential T&E waters or associated listed species. VDGIF requested that they be notified if new limitations are added to the draft 2012 permit and also recommended UV disinfection. DEQ responded on 11/8/2011 indicating that UV disinfection is already in place.

Due to the new acute toxicity permit limitation in the 2012 permit, VDGIF were contacted on 2/14/12 and informed of the new limit. As of 3/26/12 no further comments were received and the coordination effort is considered complete.

See **Attachment J** for the T&E coordination documents.

Other Agency Comments:

VDH Office of Drinking Water- VDH was provided a copy of the reissuance application on 2/3/12. By letter dated February 10, 2012 VDH confirmed that there are no public water supply raw water intakes located within 15 miles downstream of the facility. VDH did not request a copy of the draft permit for review and comment.

EPA – EPA was sent the draft permit package for review on 4/3/12. On 5/2/12 EPA indicated via email that they had performed a limited review on the WET requirements of the permit. EPA had no comments related to compliance with the WET requirements. No further coordination is needed.

26. 303(d) Listed Segments (TMDL):  
During the 2010 305(b)/303(d) Water Quality Assessment, this segment of the Meherrin River was considered a Category 5A water ("A Water Quality Standard is not attained. The water is impaired or threatened for one or more designated uses by a pollutant(s) and requires a TMDL (303d list).") The applicable fact sheets are included in **Attachment A**. The river is impaired of the Fish Consumption Use due to PCBs and mercury in fish tissue. Arsenic in fish tissue was also above its screening limit and is considered an observed effect. The Aquatic Life Use is impaired due to low dissolved

oxygen. The Recreation- and Wildlife Uses are fully supporting. The discharge is not currently included in any TMDL.

Conventional pollutant (BOD<sub>5</sub> and DO) effluent limits have been included in this permit that, based on the modeling analyses completed in 1988, are expected to maintain the ambient DO daily water quality criterion for Class III waters (refer to **Attachment I**). PCBs and mercury were reported as less than the parameter specific agency QL on the permit reissuance application. Based on this data, the facility is not expected to be a source of PCBs or mercury. The facility will neither cause nor contribute to the impairment or to violations of the Water Quality Standards (9 VAC 25-260 et seq., effective 1/6/11).

27. Attachments

Attachment A: Flow Frequency Memorandum  
Attachment B: Plant Flow Diagram  
Attachment C: Topographic Map (Emporia Quadrangle 8A) and Aerial Image  
Attachment D: Site Inspection Report and Compliance Inspection Report  
Attachment E: Ambient Data (Station 5AMHN052.34)  
Attachment F: Effluent Water Quality Criteria Monitoring data, DMR data  
Attachment G: Mix.exe, MSTRANTI data source report, MSTRANTI  
Attachment H: Stats.exe Results  
Attachment I: Stream Sanitation Memorandum (8/9/1988)  
Attachment J: Threatened and Endangered Species Screening Documents  
Attachment K: Groundwater Evaluation, Monitoring Well Location Map, and Corrective Action Plan (CAP) Phase II Approval Letter and Memo  
Attachment L: Whole Effluent Toxicity Memorandum  
Attachment M: No Exposure Certification

## **Attachment A: Flow Frequency Memorandum**

# MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY  
Piedmont Regional Office  
4949-A Cox Road Glen Allen, Virginia 23060

---

**SUBJECT:** Flow Frequency Determination / 303(d) status  
Emporia WWTP – VA0020346

**TO:** Janine Howard

**FROM:** Jennifer Palmore, P.G.

**DATE:** October 23, 2011

**COPIES:** Modeling File

The Emporia Wastewater Treatment Plant discharges to the Meherrin River in Emporia, VA. The discharge is located at river mile 5AMHN050.90. Stream flow frequencies are required for use by the permit writer in developing effluent limitations for the VPDES permit.

The VDEQ has operated a continuous record gage on the Meherrin River at Emporia, VA (#02052000) since 1951. The gage is located at the Route 301 bridge, approximately 1.3 mile upstream of the discharge point. The flow at the gage is regulated by a hydropower plant located 0.8 mile upstream; therefore only flow frequencies at the gage during the regulated period of record after April 1986 were used. Due to the proximity of the gage and the discharge, the flows can be assumed to be equal.

This analysis does not address any additional withdrawals, discharges, or springs influencing the flow between the measurement site and discharge point.

## **Meherrin River at Emporia, VA (#02052000)**

Drainage Area = 747 mi<sup>2</sup>

Statistical period = 1986-2003

High Flow Months: January to April

1Q30 = 4.1 cfs

High Flow 1Q10 = 99 cfs

1Q10 = 7.6 cfs

High Flow 7Q10 = 155 cfs

7Q10 = 18 cfs

High Flow 30Q10 = 254 cfs

30Q10 = 28 cfs

HM = 144 cfs

30Q5 = 41 cfs

During the 2010 305(b)/303(d) Water Quality Assessment, this segment of the Meherrin River was considered a Category 5A water ("A Water Quality Standard is not attained. The water is impaired or threatened for one or more designated uses by a pollutant(s) and requires a TMDL (303d list).") The applicable fact sheets are attached. The river is impaired of the Fish Consumption Use due to PCBs and mercury in fish tissue. Arsenic in fish tissue was also above its screening limit and is considered an observed effect. The Aquatic Life Use is impaired due to low dissolved oxygen. The Recreation- and Wildlife Uses are fully supporting. The discharge is not currently included in any TMDL.

Water quality data from monitoring station 5AMHN052.34 is attached. The station is located on the Meherrin River at the Rt. 301 bridge, which is approximately 1.3 mile upstream of the discharge and is co-located with the flow gage.

The receiving stream is considered a Tier 1 water. The river experiences periods of low dissolved oxygen and is currently impaired for the Aquatic Life Use. Antidegradation was not applied during the 1988 modeling effort.

If you have any questions, please do not hesitate to ask.

# 2010 Fact Sheets for 303(d) Waters

---

**RIVER BASIN:** Chowan River and Dismal Swamp Basins      **HYDROLOGIC UNIT:** 03010204

**STREAM NAME:** Meherrin River

**TMDL ID:** K09R-01-DO      **2010 IMPAIRED AREA ID:** VAP-K09R-01

**ASSESSMENT CATEGORY:** 5A      **TMDL DUE DATE:** 2020

**IMPAIRED SIZE:** 27.05 - Miles      **Watershed:** VAP-K09R

**INITIAL LISTING:** 2008

**UPSTREAM LIMIT:** Emporia Reservoir Dam

**DOWNSTREAM LIMIT:** Route 730 bridge

The Meherrin River from the Emporia Reservoir Dam to the Route 730 bridge

## **CLEAN WATER ACT GOAL AND USE SUPPORT:**

Aquatic Life Use - Not Supporting

**IMPAIRMENT:** Dissolved Oxygen

The Meherrin River was initially listed during the 1998 cycle as fully supporting but threatened of the Aquatic Life use support goal and was downgraded to impaired during the 2004 cycle due to a dissolved oxygen exceedance rate of 7/49 at the Route 602 bridge (5AMHN052.34). During the 2006 cycle, the exceedance rate fell to 2/37, therefore the segment was delisted.

However, during the 2008 cycle, the exceedance rate was 5/38, therefore the segment was relisted. The TMDL is due in 2020. The exceedance rate was 4/34 during the 2010 cycle.

**IMPAIRMENT SOURCE:** Hypolimnetic Release

The source of the low dissolved oxygen is considered unknown, but is believed to be caused by the release of hypolimnetic waters from the Emporia Reservoir dam.

**RECOMMENDATION:** UAA

# 2010 Fact Sheets for 303(d) Waters

---

<b>RIVER BASIN:</b>	Chowan River and Dismal Swamp Basins	<b>HYDROLOGIC UNIT:</b>	03010204
<b>STREAM NAME:</b>	Meherrin River, Fontaine Creek, Mill Swamp		
<b>TMDL ID:</b>	K09R-01-HG	<b>2010 IMPAIRED AREA ID:</b>	VAP-K09R-01
<b>ASSESSMENT CATEGORY:</b>	5A	<b>TMDL DUE DATE:</b>	2022
<b>IMPAIRED SIZE:</b>	60.95 - Miles	<b>Watershed:</b>	VAP-K09R
<b>INITIAL LISTING:</b>	2010		
<b>UPSTREAM LIMIT:</b>	Emporia Reservoir Dam		
<b>DOWNSTREAM LIMIT:</b>	State Line		

## CLEAN WATER ACT GOAL AND USE SUPPORT:

Fish Consumption Use - Not Supporting

**IMPAIRMENT:** Mercury

During the 2010 cycle, the Virginia Department of Health issued a fish consumption advisory due to mercury in bowfin and largemouth bass. The advisory includes the Meherrin River from Emporia Reservoir dam to the state line, including the tributaries Fontaine Creek and Mill Swamp up to the I-95 bridge crossings. The segment will be considered impaired of the Fish Consumption Use. The advisory was based on mercury exceedances at DEQ monitoring stations 5AMHN026.54, 5AMHN051.43, 5AFON006.07, and 5AMLS001.42.

**IMPAIRMENT SOURCE:** Unknown, Atmospheric Deposition

The source of the mercury is unknown, but atmospheric conditions are suspected.

**RECOMMENDATION:** Problem Characterization

# 2010 Fact Sheets for 303(d) Waters

---

<b>RIVER BASIN:</b>	Chowan River and Dismal Swamp Basins	<b>HYDROLOGIC UNIT:</b>	03010204
<b>STREAM NAME:</b>	Meherrin River		
<b>TMDL ID:</b>	K09R-01-PCB	<b>2010 IMPAIRED AREA ID:</b>	VAP-K09R-01
<b>ASSESSMENT CATEGORY:</b>	5A	<b>TMDL DUE DATE:</b>	2016
<b>IMPAIRED SIZE:</b>	27.05 - Miles	<b>Watershed:</b>	VAP-K09R
<b>INITIAL LISTING:</b>	2004		
<b>UPSTREAM LIMIT:</b>	Emporia Reservoir Dam		
<b>DOWNSTREAM LIMIT:</b>	Route 730 bridge		

The Meherrin River from the Emporia Reservoir Dam to the Route 730 bridge

## CLEAN WATER ACT GOAL AND USE SUPPORT:

Fish Consumption Use - Not Supporting

**IMPAIRMENT:** Fish Tissue - PCBs, VDH Fish Consumption Advisory

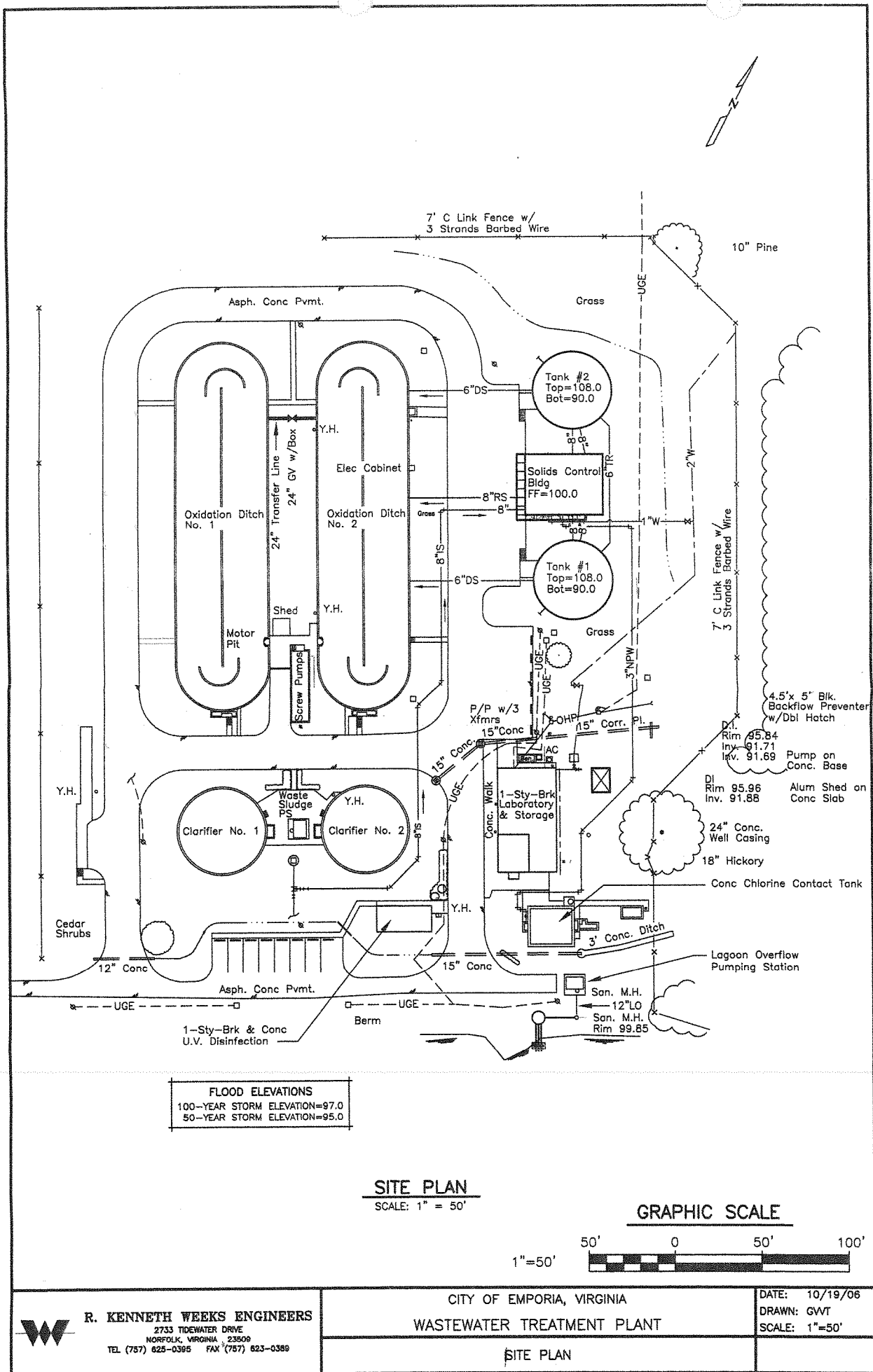
During the 2004 cycle, the Meherrin River from the Emporia Reservoir dam downstream approximately 5 miles was assessed as not supporting the Fish Consumption Use due to PCBs in fish tissue in two samples at station 5AMHN051.43. During the 2006 cycle, VDH issued a fish consumption advisory for PCBs from the Emporia dam to the Route 730 bridge. The segment was extended to match the advisory. The TMDL due date is 2016.

**IMPAIRMENT SOURCE:** Unknown

The source(s) of the fish tissue contaminants are considered unknown.

**RECOMMENDATION:** Problem Characterization

## **Attachment B: Plant Flow Diagram**



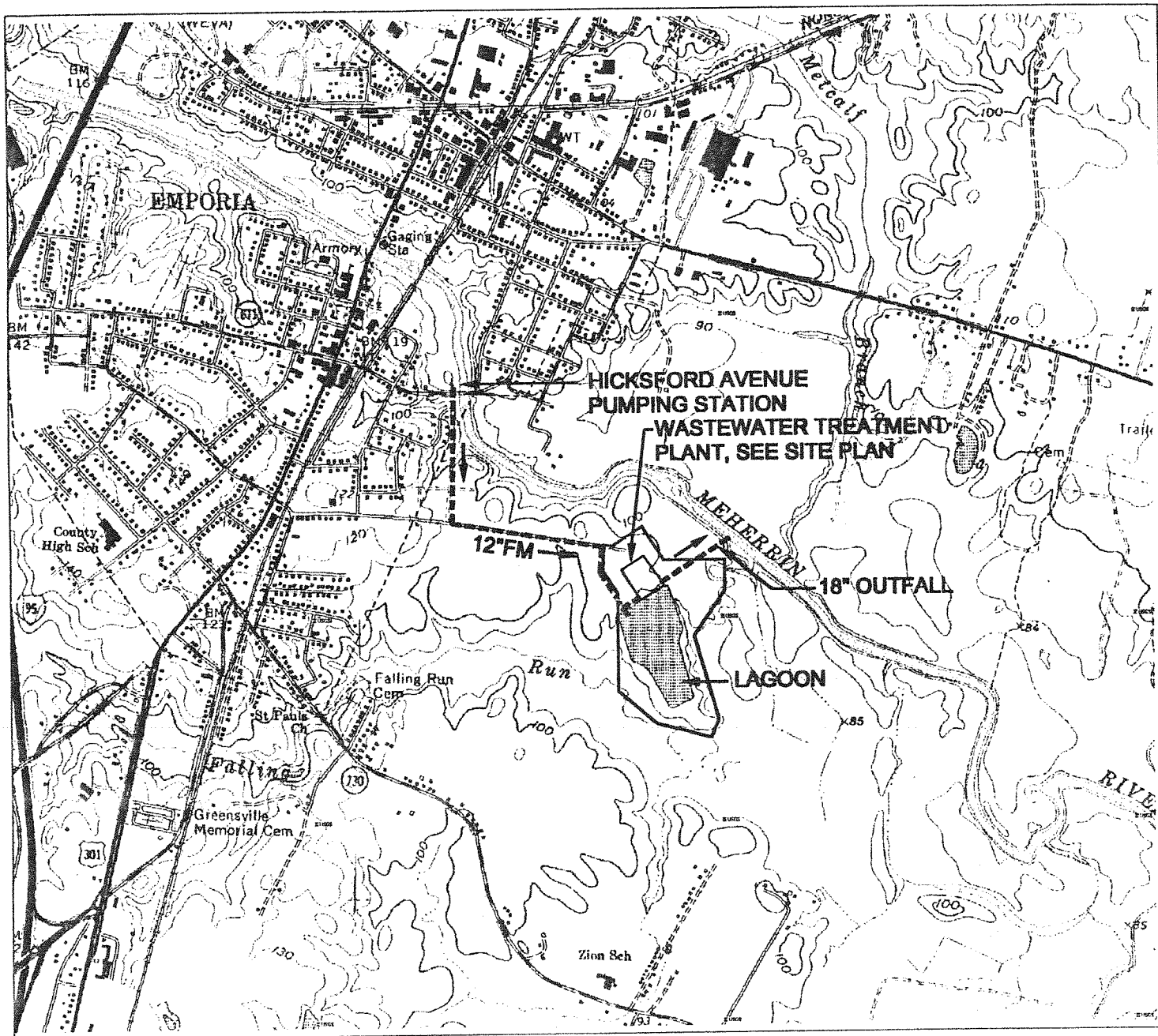
**R. KENNETH WEEKS ENGINEERS**  
 2733 TIDEWATER DRIVE  
 NORFOLK, VIRGINIA 23508  
 TEL (757) 625-0395 FAX (757) 623-0399

CITY OF EMPORIA, VIRGINIA  
 WASTEWATER TREATMENT PLANT

DATE: 10/19/06  
 DRAWN: GWT  
 SCALE: 1"=50'

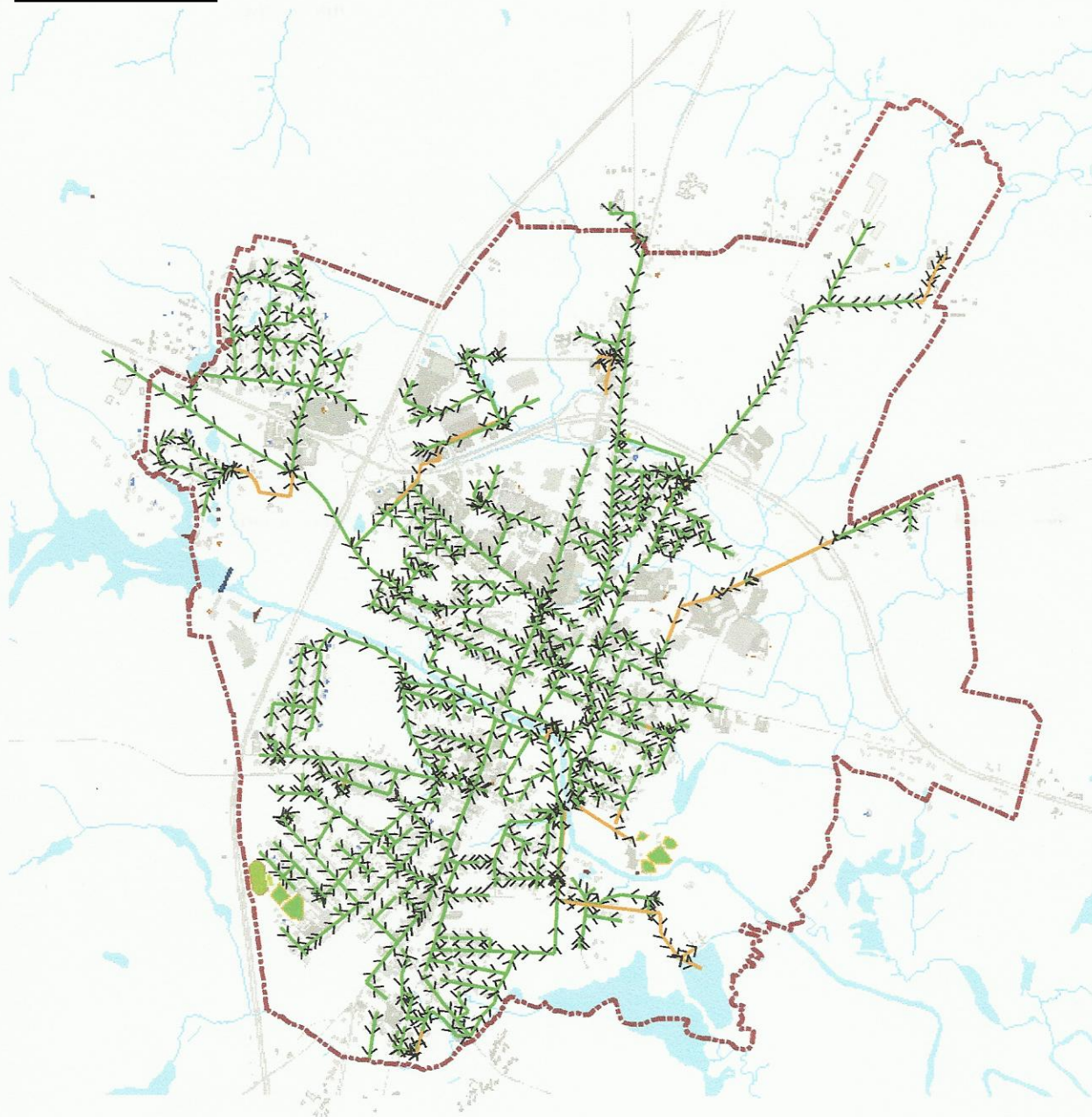
SITE PLAN

**Attachment C: Topographic Map (Emporia Quadrangle 8A)  
and Aerial Image**



**TOPOGRAPHIC MAP**  
SCALE: 1" = 2000'  
USGS EMPORIA QUADRANGLE

Emporia City  
Limits (red  
dashed line)



# Map Export













## Legend

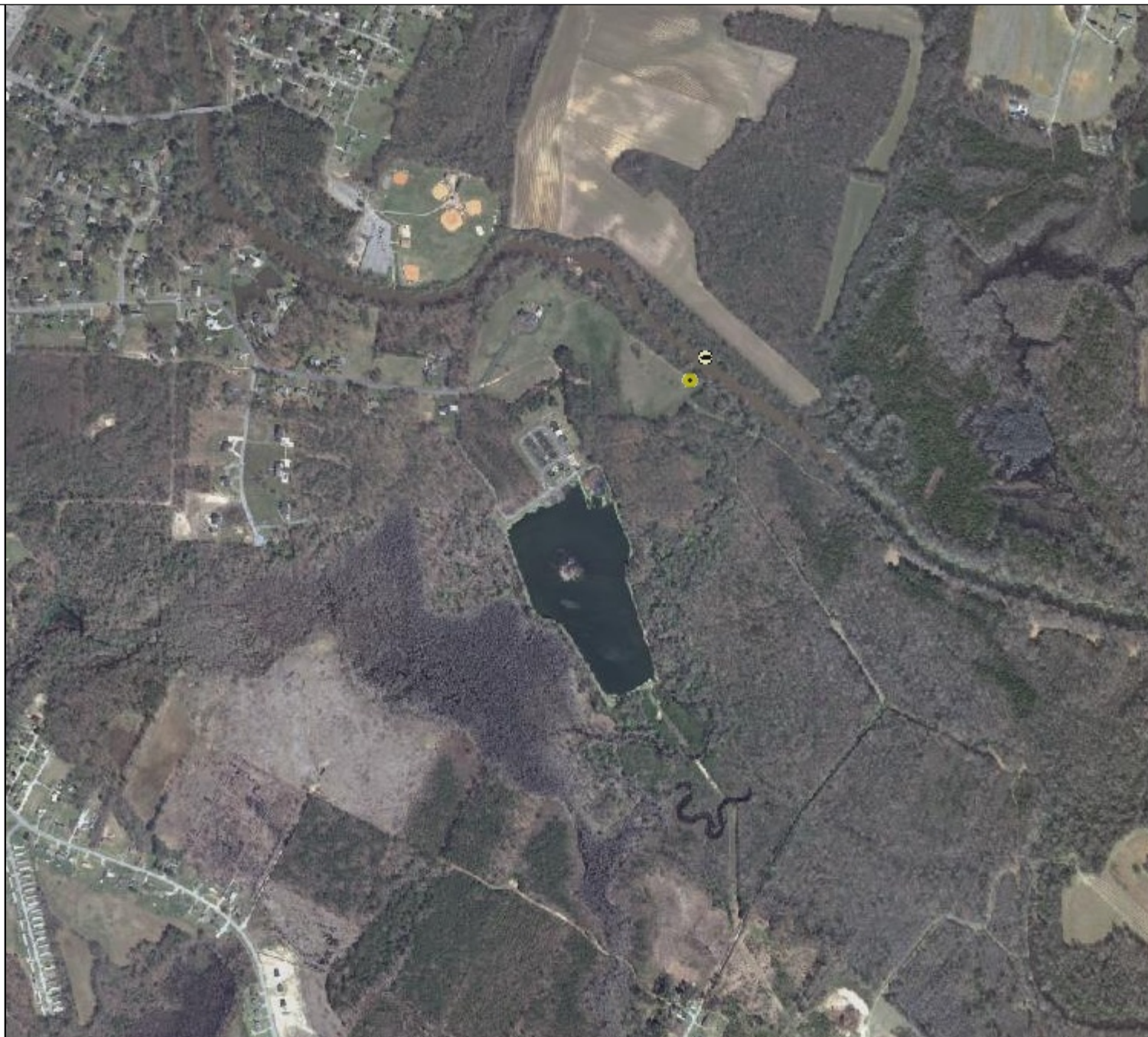
### DEQ Offices (2009)

-  DEQ Central Office
-  South West Regional Office
-  Blue Ridge Regional Office
-  Northern Regional Office
-  Piedmont Regional Office
-  Tidewater Regional Office
-  Valley Regional Office

### VPDES (2004)

### 2010 Monitoring Stations

-  Ambient
-  Ambient/Biological
-  Ambient/Biological/Fish Tissue
-  Ambient/Fish Tissue
-  Biological
-  Biological/Fish Tissue
-  Citizen Monitoring
-  Federal
-  Fish Tissue
-  Trend
-  VDH-BEACH
-  DEQ Regions (2009)



Feet

0 200 400 600 800  
Map Scale: 1:12,000



**Attachment D: Site Inspection Report and Compliance  
Inspection Report**

# MEMORANDUM

## DEPARTMENT OF ENVIRONMENTAL QUALITY

*Piedmont Regional Office*

4949-A Cox Rd Glen Allen, VA 23060

(804) 527-5020

SUBJECT: Site Visit- VA0020346- Emporia Wastewater Treatment Plant Site Visit

TO: File

FROM: Janine Howard, PRO Permit Writer

DATE: 17 November 2011

On November 9, 2011 Meredith Williams (DEQ Water Compliance), Megan Hayes (DEQ Air Compliance), and I met with Larry Epps (WWTP Superintendent) and Melvin Prince (WWTP Operator) at the Emporia WWTP. The facility is located at 500 Tall Oaks Drive in Emporia, VA. We arrived at approximately 9:40am and departed the plant at 10:50am.

The purpose of the visit was a combined compliance inspection and routine site visit made as part of the reissuance process. The facility received a Warning Letter for the month of September for TSS and *E. coli* permit limitation exceedances and it is expected that a similar warning letter will be issued for the month of October, likely resulting in a referral to Enforcement staff. A dark, ashy influent is blamed for the limitation exceedances and is thought to be sourced to the Georgia Pacific plywood plant in Emporia. The wastewater treatment plant first began experiencing an upset in the middle of September, and continues to struggle to date. Georgia Pacific and the Emporia WWTP staff are working together to come to a solution and reduce the dark influent. The ashy influent is near-black in color and the sediment particles are extremely fine. The operators have implemented a temporary polymer feed system to aid settling. The operators tried two types of polymer, the first of which did not provide enough settling to lower the TSS in the final effluent or keep the ultraviolet (UV) system clear of obstruction. The second polymer, "C-338 Clarifloc (R) solution polymer" successfully prompted enough flocculation and settling to allow the plant to meet its TSS limitation. Prior to the polymer addition, the dark, ashy substance coated the ultraviolet bulbs in the disinfection system, preventing transmittance and an adequate kill. This in turn resulted in bacteria counts of over 2,000 N/cmL at the height of the upset. Refer to the Compliance Inspection report (attached) by Meredith Williams for further details regarding the upset and compliance issues.

We toured the facility beginning with the headworks. The influent flows first to a mechanical rotating screen and at the time of the site visit the influent remained dark in color (Figure 1). Larry indicated that the influent is typically light grey as opposed to near black. Following screening, the wastewater flows through a grit channel which allows larger solids to settle. A grit collector runs on a timer for ten (10) minutes every hour and sweeps the grit channel, keeping it clear of obstruction (Figure 2). The grit is funneled to a dumpster for disposal. A caustic tank is located at the headworks and may be utilized to adjust the pH of the wastewater. The feed is automatically controlled via a pH probe. Larry indicated that they have not had to feed any caustic for pH adjustment in a few months. The caustic tank is surrounded by a large containment wall to prevent any potential spill or leak from reaching state waters (Figure 3). Following primary screening, the wastewater flows to a series of oxidation ditches. The first is anoxic, with a dissolved oxygen concentration of 0.1- 0.2 mg/L. The second oxidation ditch is maintained with a dissolved oxygen concentration of 1.5- 3.0 mg/L (Figure 4). A cylindrical set of rotating disks are used to aerate the basins (Figure 5 and 6).

Return sludge from the clarifiers is directed to the first oxidation ditch via a set of screw pumps (Figure 7). Larry stated that the operators rarely utilize both pumps, as one is adequate to handle the typical flow. The plant has two clarifiers and the flow is evenly split between the two. Each clarifier is equipped with a brush arm which continually cleans the clarifiers (Figure 8). We viewed the Cannibal "solids reduction system" (Figure 9), which continues to fall short of expectations. The system was installed in 2005 and it was hoped that it would eliminate waste sludge. However, some sludge is still generated on site and the facility continues to dispose of a small amount of sludge in the 22 acre sludge lagoon out of necessity. The plant is still working with the manufacturer with the aim of fixing the Cannibal system so that it works as designed. The sludge lagoon is occasionally utilized as an equalization basin during period of high precipitation. Most recently, the lagoon was used in this manner during Hurricane Irene.

In 2001, the plant installed a UV disinfection system to replace the older gas chlorination system. The UV system consisted of two tracts (UV-A and UV-B), each of which contains four bulbs (Figure 10). The wastewater flow is evenly split between UV-A and UV-B. Under usual operating circumstances, the bulbs provide an adequate kill on power level 1 (out of 3) and are replaced every 8,000 hours or approximately once per year. Due to the plant upset and increased turbidity of the wastewater (even with polymer addition), Larry is presently running the UV system on power level 3 to provide an adequate kill and maintain compliance with the permit *E. coli* limitation. Continual use of power level 3 will half the life of the UV bulbs. Following UV disinfection the wastewater flows through the old chlorine contact tank (Figure 11), to a Parshall flume where the flow is measured by an ultra-sonic sensor, and down a step aerator (Figure 12) to the outfall. The final effluent appeared fairly clear and due to continual polymer feeding, Larry expects to meet the TSS and *E. coli* permit limitations for the month of November.

The site itself was well kept and the grounds were immaculate. All chemicals are stored under cover or with containment, and do not pose a storm water contamination concern.



Figure 1. Influent and rotating screen



Figure 2. Grit Channel and grit collector



Figure 3. Caustic tank and containment wall



Figure 4. Second oxidation ditch (the first oxidation ditch is visible in the background)



Figure 5. Rotating disks



Figure 6. Inactive rotating disks



Figure 7. Return sludge screw pump



Figure 8. Clarifier brushes



Figure 9. Cannibal system

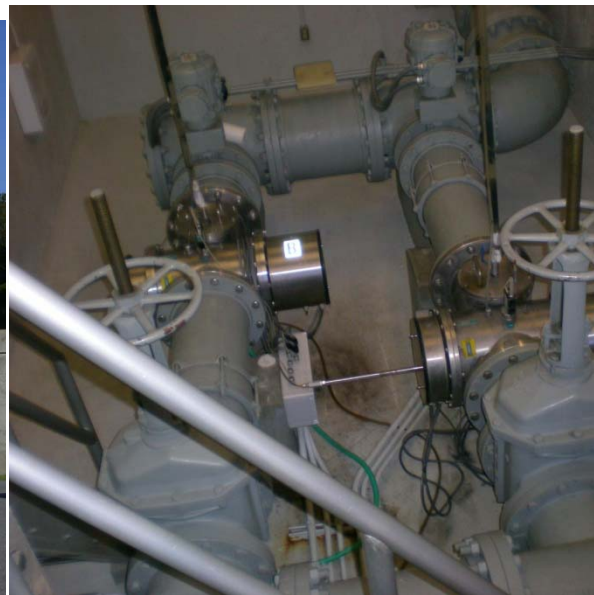


Figure 10. UV disinfection system

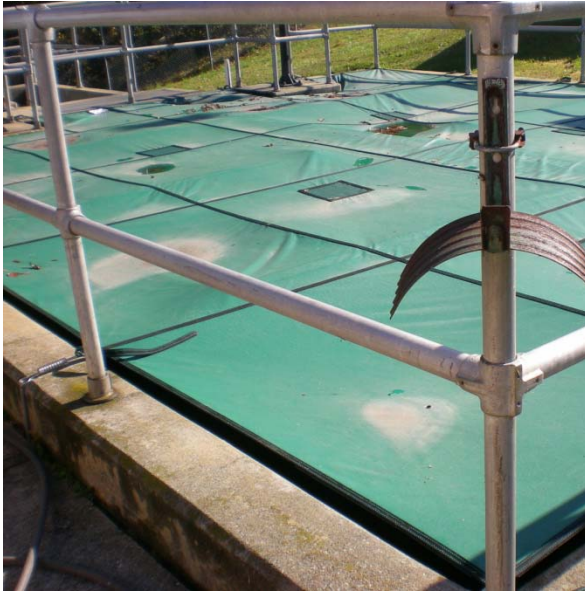


Figure 11. Covered chlorine contact tank (flow-through, no treatment)



Figure 12. Final effluent and step aerator

# Virginia Department of Environmental Quality

## COMPLIANCE INSPECTION REPORT

<b>FACILITY NAME:</b> <u>City of Emporia WWTP</u>		<b>INSPECTION DATE:</b> <u>11/9/11</u>	
<b>PERMIT No.:</b> <u>VA0020346</u>		<b>INSPECTOR:</b> <u>Meredith Williams</u>	
<b>TYPE OF FACILITY:</b>		<b>REPORT DATE:</b> <u>11/10/11</u>	
<input checked="" type="checkbox"/> Municipal <input checked="" type="checkbox"/> Major <input type="checkbox"/> Industrial <input type="checkbox"/> Minor <input type="checkbox"/> Federal <input type="checkbox"/> Small Minor <input type="checkbox"/> HP <input type="checkbox"/> LP		<b>TIME OF INSPECTION:</b>	<div style="display: flex; justify-content: space-between;"> <span><u>0937</u> Arrival</span> <span><u>1110</u> Departure</span> </div>
		<b>TOTAL TIME SPENT (including prep &amp; travel)</b>	<u>12 hours</u>
<b>PHOTOGRAPHS:</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<b>UNANNOUNCED INSPECTION?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
<b>REVIEWED BY / Date:</b>			
<b>PRESENT DURING INSPECTION:</b> Larry Epps, Melvin Prince-Plant Operators; Janine Howard, Megan Hayes-DEQ Staff			

<u><b>WL # W2011-10-P-1004:</b></u> <u><b>Paraphrase Noncompliance issues</b></u>	<u><b>Reported Cause of Noncompliance:</b></u>	<u><b>Corrective Action Taken:</b></u>
1. The September 2011 DMR reported a TSS average loading of 369 kg/day, versus a permit allowable average loading of 107 kg/day. 2. The September 2011 DMR reported a maximum loading of 427 kg/day, versus a permit allowable maximum loading of 255 kg/day. 3. The September 2011 DMR reported a TSS average concentration of 144.5 mg/L, versus a permit allowable average concentration of 30 mg/L. 4. The September 2011 DMR reported an E. coli average concentration of 140 #C/mL, versus a permit allowable average concentration of 126 #C/mL.	1-4. The cause of the noncompliance has been associated to a plant upset that was reportedly caused by an unusual industrial discharge to the WWTP. The influent to the WWTP was black in color and very high in solids, which caused the UV disinfection system to become ineffective. The unusual discharge caused the bulbs and sleeves in the UV system to become "burned" and blackened.	1-4. Utility personnel located the manhole at which the unusual discharge was entering the sewer system. Polymer is being added to the WWTP to improve the clarity of the wastewater which will allow the UV system to function properly. The UV system was fully cleaned and rebuilt for optimal performance. The addition of polymer is temporary until the black influent has ceased.

### **INSPECTION OVERVIEW AND CONDITION OF TREATMENT UNITS**

<p>Treatment units at the WWTP consist of: Screening, Grit Removal, Extended Aeration (oxidation ditch), Clarification, UV disinfection and post aeration. Because the Cannibal system has not performed as expected, the majority of the sludge is disposed of in the sludge lagoon.</p> <p>At the time of this inspection, the influent to the WWTP was black in color with a large amount of suspended solids. The solids had the appearance of suspended ash. The operators reported that this type of unusual influent has been the cause of the problems at the WWTP. The operators are adding polymer to the oxidation ditch to improve the settling characteristics of the wastewater. The final effluent appeared clear at the time of inspection. The inspector noted that black soot was present on the step cascade walls and autosampler. Operators indicated this soot resulted from the mist of the effluent off the step cascade.</p> <p>Following the site visit at the WWTP, the Operators accompanied DEQ staff to the manhole (located on East Atlantic Street) where the unusual discharge was entering the collection system. This manhole is the location in which Georgia Pacific (GP) reportedly discharges to the POTW. DEQ staff observed the black wastewater discharge into the collection system. The discharge occurred approximately every 4 minutes and lasted approximately 20 seconds. This cycle repeated while DEQ staff and Operators were present. Operators stated they had been in communication with GP and this discharge did appear to be ash wash water from the scrubber system. The Operators and GP personnel were scheduled to meet on the day following this inspection to discuss the issue.</p> <p>DEQ inspectors visited GP (VA0006483) following the site visit at the Emporia WWTP to conduct a multi-media Recon Inspection of the scrubber system. More details regarding the visit can be found in the Memo written by M. Hayes, DEQ Air Inspector (A copy of the Memo has been placed in ECM under permit number VA0006483).</p>
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# VA DEQ Compliance Inspection Report

Permit #	VA0020346
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**\*EFFLUENT FIELD DATA: \*Data analyzed on 11/8/11 by WWTP Staff.**

Flow <span style="border: 1px solid black; padding: 2px 10px;">.714</span> MGD	Dissolved Oxygen <span style="border: 1px solid black; padding: 2px 10px;">9.4</span> mg/L	TRC (Contact Tank) <span style="border: 1px solid black; padding: 2px 10px;">N/A</span> mg/L
pH <span style="border: 1px solid black; padding: 2px 10px;">6.89</span> S.U.	Temperature <span style="border: 1px solid black; padding: 2px 10px;">19.1</span> °C	TRC (Final Effluent) <span style="border: 1px solid black; padding: 2px 10px;">N/A</span> mg/L
<b>Was a Sampling Inspection conducted?</b> <input type="checkbox"/> Yes (see Sampling Inspection Report) <input checked="" type="checkbox"/> No		

## CONDITION OF OUTFALL AND EFFLUENT CHARACTERISTICS:

1. Type of outfall: <input checked="" type="checkbox"/> Shore based <input type="checkbox"/> Submerged	Diffuser? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Are the outfall and supporting structures in good condition?	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Final Effluent (evidence of following problems):	<input type="checkbox"/> Sludge bar <input type="checkbox"/> Grease <input type="checkbox"/> Turbid effluent <input type="checkbox"/> Visible foam <input type="checkbox"/> Unusual color <input type="checkbox"/> Oil sheen
4. Is there a visible effluent plume in the receiving stream?	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Receiving stream: <input type="checkbox"/> No observed problems <input type="checkbox"/> Indication of problems (explain below)	
<b><u>Comments: The final effluent appeared clear. DEQ staff did not observe the receiving stream on the day of inspection due to extreme muddy conditions. Melvin Prince stated that he viewed the final outfall/receiving stream within the past week and did not observe any black material.</u></b>	

## REQUEST for ACTION:

1. None.
----------

## NOTES and COMMENTS:

1. The plant operators are working hard to meet permit limits and should be commended for their efforts in running the plant under these unusual conditions. 2. Continue efforts in working with industrial sewer users to determine the source of the unusual influent. 3. Continue to keep DEQ informed of the status of the treatment plant and any operational changes that may be made (i.e. use of chlorine/dechlor).
---

# VA DEQ Compliance Inspection Report

Facility No. VA0020346  
Digital Photographs Taken 11/9/11



Photograph 1: Polymer addition to oxidation ditch



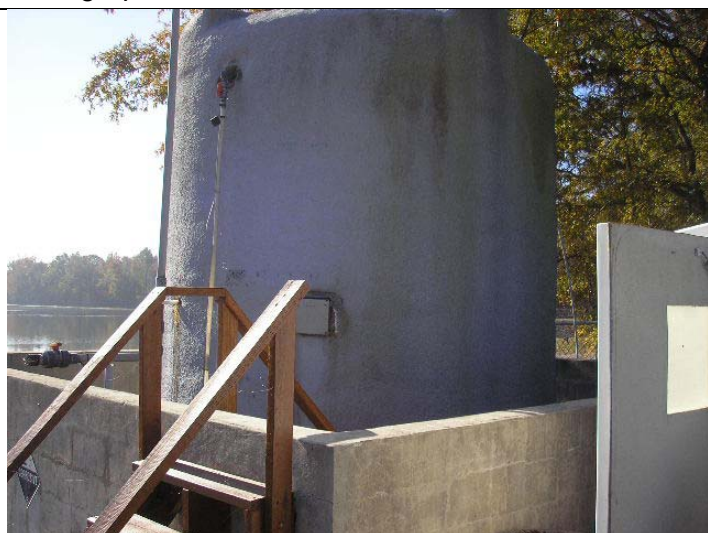
Photograph 2: Screening



Photograph 3: Influent; note unusual black color



Photograph 4: Grit removal



Photograph 5: Caustic for pH adjustment (if necessary) at headworks



Photograph 6: Oxidation ditch (2 of 2)

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Photograph 7: Unusual black wastewater in oxidation ditch; suspended solids have a black, metallic appearance



Photograph 8: Oxidation ditch (1 of 2)



Photograph 9: Return sludge from clarifier to oxidation ditch



Photograph 10: 1 of 2 Clarifiers



Photograph 11: Effluent weirs on clarifier; effluent appears fairly clear; some black material has settled in effluent trough



Photograph 12: 2 of 2 Clarifiers; automatic cleaning brushes have been pulled up in order to not disturb black material that has settled

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Photograph 13: Enclosed UV system; 8 bulbs in each unit; both units currently operating to ensure proper disinfection



Photograph 14: Old CCT; flow continues to pass through this tank



Photograph 15: Effluent weir and flow meter; meter last calibrated 6/30/11



Photograph 16: Post aeration; effluent fairly clear



Photograph 17: Screening system that precedes the Cannibal system



Photograph 18: Sludge holding tank

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Photograph 19: Manhole along East Atlantic St.; note black soot material around top edge of manhole



Photograph 20: Discharge from Georgia Pacific

## **Attachment E: Ambient Data (Station 5AMHN052.34)**

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler	Fdt Do Optical
5AMHN052.34	2/26/1968	S	0.3	3.33	7.5		11.5	
5AMHN052.34	4/30/1968	S	0.3	16.67	8		7.5	
5AMHN052.34	7/28/1968	S	0.3	27.78	7.3		7.2	
5AMHN052.34	8/1/1968	S	0.3	32.22	6		5.7	
5AMHN052.34	8/29/1968	S	0.3	25	7		5	
5AMHN052.34	10/1/1968	S	0.3	21.11	6.5		1.5	
5AMHN052.34	1/23/1969	S	0.3	4.44	7.3		13.19	
5AMHN052.34	4/20/1969	S	0.3	16.11	6.8		10.09	
5AMHN052.34	7/3/1969	S	0.3	27.78	7.5		6.6	
5AMHN052.34	2/18/1970	S	0.3	7.78	7.2		12.79	
5AMHN052.34	3/11/1970	S	0.3	10	6.8		10.29	
5AMHN052.34	4/16/1970	S	0.3	13.33	6.9		11	
5AMHN052.34	5/12/1970	S	0.3	21.67			8.9	
5AMHN052.34	6/18/1970	S	0.3	27.22	7		6.8	
5AMHN052.34	6/29/1970	S	0.3	24.44	7.3		8.4	
5AMHN052.34	8/31/1970	S	0.3	27.78	6.8		6.6	
5AMHN052.34	10/1/1970	S	0.3	17.22	6.8		7.06	
5AMHN052.34	11/9/1970	S	0.3	13.89	7.2		10	
5AMHN052.34	12/6/1970	S	0.3	7.22	7		11.39	
5AMHN052.34	1/11/1971	S	0.3	3.33	6.7		13.39	
5AMHN052.34	2/3/1971	S	0.3	2.22	7		14.39	
5AMHN052.34	3/21/1971	S	0.3	10	7.3		11.79	
5AMHN052.34	4/26/1971	S	0.3	16.67	7.5		9	
5AMHN052.34	5/5/1971	S	0.3	15.56	7.3		9.8	
5AMHN052.34	6/10/1971	S	0.3	25.56	7		8	
5AMHN052.34	7/26/1971	S	0.3	26.11	6.7		7.4	
5AMHN052.34	8/17/1971	S	0.3	25.56	7.2		7.2	
5AMHN052.34	9/22/1971	S	0.3	21.11	7		7.4	
5AMHN052.34	11/8/1971	S	0.3	12.22	7.3		10.79	
5AMHN052.34	12/1/1971	S	0.3	6.67	6.9		12.39	
5AMHN052.34	1/17/1972	S	0.3	4.44	7.2		13.39	
5AMHN052.34	2/7/1972	S	0.3	4.44	6.7		13.59	
5AMHN052.34	3/27/1972	S	0.3	6.11	6.7		10	
5AMHN052.34	4/12/1972	S	0.3	11.11	6.8		11	
5AMHN052.34	5/3/1972	S	0.3	18.89	7.2		8.2	
5AMHN052.34	5/31/1972	S	0.3	20.56	7.2		8.4	
5AMHN052.34	7/12/1972	S	0.3	22.22	7.3		8.1	
5AMHN052.34	8/3/1972	S	0.3	25.56	7.3		7.6	
5AMHN052.34	9/11/1972	S	0.3	25	7.2		7.8	
5AMHN052.34	10/5/1972	S	0.3	18.89	6.7		8	
5AMHN052.34	11/13/1972	S	0.3	12.22	6.7		13	
5AMHN052.34	12/18/1972	S	0.3	5.56	6.8		9.8	
5AMHN052.34	1/3/1973	S	0.3	8.89	6.8		11	
5AMHN052.34	2/15/1973	S	0.3	5.56	7.2		13.19	
5AMHN052.34	3/15/1973	S	0.3	16.67	7.2		10.39	
5AMHN052.34	4/24/1973	S	0.3	20	7.5		9	
5AMHN052.34	6/19/1973	S	0.3	24.44	6.8		8	
5AMHN052.34	7/29/1973	S	0.3	23.33			8.2	
5AMHN052.34	9/16/1973	S	0.3	23.33	7.2			
5AMHN052.34	10/3/1973	S	0.3	22.22	7.2		7.6	
5AMHN052.34	11/6/1973	S	0.3	13.33	7.6		9.8	
5AMHN052.34	12/13/1973	S	0.3	5.56	7.8		11.79	
5AMHN052.34	1/9/1974	S	0.3	7.78	7.5		12	
5AMHN052.34	2/12/1974	S	0.3	4.44	7.5		12.19	
5AMHN052.34	3/6/1974	S	0.3	14.44	6.8		10	
5AMHN052.34	4/25/1974	S	0.3	15.56	7.5		9.2	
5AMHN052.34	5/9/1974	S	0.3	15.56	7.7		9.4	
5AMHN052.34	6/20/1974	S	0.3	26.67	7.5		8	
5AMHN052.34	7/7/1974	S	0.3	25.56	7.5		7.8	
5AMHN052.34	8/22/1974	S	0.3	25.56	7.4		7.2	
5AMHN052.34	9/3/1974	S	0.3	26.11	7.2		7.6	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler	Fdt Do Optical
5AMHN052.34	10/14/1974	S	0.3	15	7		7.2	
5AMHN052.34	11/19/1974	S	0.3	8.89	7		9	
5AMHN052.34	12/10/1974	S	0.3	4.44	7		12	
5AMHN052.34	1/10/1975	S	0.3	3.33	7		12	
5AMHN052.34	2/27/1975	S	0.3	7.22	7		11.29	
5AMHN052.34	3/12/1975	S	0.3	3.33	7.4		12	
5AMHN052.34	4/29/1975	S	0.3	16.67	7		9.2	
5AMHN052.34	5/19/1975	S	0.3	19.44	7		9.6	
5AMHN052.34	6/17/1975	S	0.3	25.56	7.5		7.8	
5AMHN052.34	7/16/1975	S	0.3	22.22	6.4		8.4	
5AMHN052.34	8/14/1975	S	0.3		7		7.6	
5AMHN052.34	9/16/1975	S	0.3	21.11	7.5		8.6	
5AMHN052.34	10/28/1975	S	0.3	17.78	7.5		9.2	
5AMHN052.34	11/11/1975	S	0.3	15.56	7.5		9.6	
5AMHN052.34	12/16/1975	S	0.3	7.78	6.8		12	
5AMHN052.34	1/21/1976	S	0.3	2.22	7		14.39	
5AMHN052.34	3/8/1976	S	0.3	13.89	7.4		10.19	
5AMHN052.34	4/13/1976	S	0.3	13.89	7.8		10.29	
5AMHN052.34	5/19/1976	S	0.3	17	7.3		7	
5AMHN052.34	6/14/1976	S	0.3	22.78	7.9		7.5	
5AMHN052.34	7/19/1976	S	0.3	26.67	7.5		6.8	
5AMHN052.34	8/23/1976	S	0.3	26.67	7.5		7.4	
5AMHN052.34	11/18/1976	S	0.3	6.67	7.5		12.19	
5AMHN052.34	11/30/1976	S	0.3	8.33	7.6		11.79	
5AMHN052.34	2/15/1977	S	0.3		7.5		12.19	
5AMHN052.34	3/14/1977	S	0.3	1.5	7		9	
5AMHN052.34	5/4/1977	S	0.3	19	8.8		8	
5AMHN052.34	7/18/1977	S	0.3	2.9	7		6.3	
5AMHN052.34	8/8/1977	S	0.3	3.3	7.8		5.6	
5AMHN052.34	11/3/1977	S	0.3	15	7		9.5	
5AMHN052.34	12/5/1977	S	0.3	0.9	9		11.39	
5AMHN052.34	2/9/1978	S	0.3	0.3	8		14.39	
5AMHN052.34	4/5/1978	S	0.3	16.19	7.5		10	
5AMHN052.34	6/8/1978	S	0.3	24	7.5		8	
5AMHN052.34	7/10/1978	S	0.3	26	7.3		7.5	
5AMHN052.34	8/22/1978	S	0.3	27	7		6.9	
5AMHN052.34	8/31/1978	S	0.3	27	7.4		6.1	
5AMHN052.34	10/5/1978	S	0.3	18.5	7.5		8.7	
5AMHN052.34	12/6/1978	S	0.3	11	6.5		10.6	
5AMHN052.34	6/22/1979	S	0.3		7.6		8	
5AMHN052.34	8/14/1979	S	0.3	23	7.5		8.3	
5AMHN052.34	10/17/1979	S	0.3	13.5	7.3		10.3	
5AMHN052.34	11/20/1979	S	0.3	11	7.5		10.8	
5AMHN052.34	12/18/1979	S	0.3	6	7.3		12.4	
5AMHN052.34	1/14/1980	S	0.3	5	6.3		13.2	
5AMHN052.34	2/20/1980	S	0.3	5	7.2		9.6	
5AMHN052.34	3/26/1980	S	0.3	10.5	7.5		11.3	
5AMHN052.34	4/23/1980	S	0.3	18.5	7.5		8.8	
5AMHN052.34	5/21/1980	S	0.3	23	7.5		9	
5AMHN052.34	6/25/1980	S	0.3	23	7.6		7.3	
5AMHN052.34	7/9/1980	S	0.3	27	7.5		7.2	
5AMHN052.34	8/5/1980	S	0.3	30	7		4.6	
5AMHN052.34	9/30/1980	S	0.3					
5AMHN052.34	10/28/1980	S	0.3	13	7.1		9.2	
5AMHN052.34	11/18/1980	S	0.3	8	7		11.1	
5AMHN052.34	1/27/1981	S	0.3	4.5	7.1		9.8	
5AMHN052.34	2/24/1981	S	0.3	9	7		12.2	
5AMHN052.34	3/24/1981	S	0.3	8	7.5		11.5	
5AMHN052.34	4/21/1981	S	0.3	18			9.8	
5AMHN052.34	5/19/1981	S	0.3	18	7		7.8	
5AMHN052.34	6/2/1981	S	0.3	20	7.5		7.8	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler	Fdt Do Optical
5AMHN052.34	7/1/1981	S	0.3	25.5	7.1		5.8	
5AMHN052.34	8/3/1981	S	0.3	25.5	6.7		5.2	
5AMHN052.34	9/1/1981	S	0.3	25	6.8		5.8	
5AMHN052.34	10/22/1981	S	0.3	15.5	7.1		6.2	
5AMHN052.34	11/30/1981	S	0.3	7			10.2	
5AMHN052.34	12/10/1981	S	0.3	4	7.3		10.4	
5AMHN052.34	1/5/1982	S	0.3	5.5	6.6		10.2	
5AMHN052.34	2/3/1982	S	0.3	5	6.1		8.8	
5AMHN052.34	3/3/1982	S	0.3	6	6.6		9.8	
5AMHN052.34	4/7/1982	S	0.3	12	7		8.1	
5AMHN052.34	5/4/1982	S	0.3	19	7.3		8.1	
5AMHN052.34	7/6/1982	S	0.3	25	7.1		6.8	
5AMHN052.34	8/4/1982	S	0.3	25.5	6.8		7.4	
5AMHN052.34	9/15/1982	S	0.3	21	7.3		7.4	
5AMHN052.34	10/6/1982	S	0.3	20.5	7		8.3	
5AMHN052.34	11/4/1982	S	0.3	15	7		10	
5AMHN052.34	12/2/1982	S	0.3	10.5	6.7		11.6	
5AMHN052.34	1/5/1983	S	0.3	5	7		12.2	
5AMHN052.34	2/8/1983	S	0.3	4	6.5		12.8	
5AMHN052.34	3/3/1983	S	0.3	9	6.7		12.5	
5AMHN052.34	4/5/1983	S	0.3	12	6.8		11	
5AMHN052.34	5/5/1983	S	0.3	20.5	7.5		9.4	
5AMHN052.34	6/7/1983	S	0.3	23	7.5		8.4	
5AMHN052.34	8/3/1983	S	0.3	27	7.1		6.1	
5AMHN052.34	9/19/1983	S	0.3	22.5	6.8		11.2	
5AMHN052.34	10/17/1983	S	0.3	17.5	7		8.8	
5AMHN052.34	11/9/1983	S	0.3	14.5	7		9.3	
5AMHN052.34	12/7/1983	S	0.3	8.5	6.8		11.6	
5AMHN052.34	1/31/1984	S	0.3	4	6.7		12.3	
5AMHN052.34	3/7/1984	S	0.3	7.5	7		12.5	
5AMHN052.34	4/2/1984	S	0.3	11	6.4		11.2	
5AMHN052.34	4/30/1984	S	0.3	18.5	6.9		9.7	
5AMHN052.34	6/18/1984	S	0.3	27	6.5		6.4	
5AMHN052.34	7/23/1984	S	0.3	25	6.53		7.9	
5AMHN052.34	8/20/1984	S	0.3	25	6.68		7.9	
5AMHN052.34	9/17/1984	S	0.3	20.6	6.8		9.5	
5AMHN052.34	10/17/1984	S	0.3	17.1	6.65		8.9	
5AMHN052.34	11/14/1984	S	0.3	7	6.4		14.8	
5AMHN052.34	1/30/1985	S	0.3	1.1	6.7		16.1	
5AMHN052.34	2/6/1985	S	0.3	2.5	5.7		13.2	
5AMHN052.34	3/13/1985	S	0.3	7.5	6.4		13.3	
5AMHN052.34	4/9/1985	S	0.3	15	7.5		10.6	
5AMHN052.34	4/10/1985	S	0.3	14	7		10	
5AMHN052.34	5/15/1985	S	0.3	21	7.3		8.8	
5AMHN052.34	5/22/1985	S	0.3	25			8	
5AMHN052.34	6/4/1985	S	0.3	24.5	7.5		7.8	
5AMHN052.34	7/10/1985	S	0.3	27.4	6.8		5	
5AMHN052.34	8/6/1985	S	0.3	24	6.9		7.7	
5AMHN052.34	10/30/1985	S	0.3	12	6.7		10.8	
5AMHN052.34	12/9/1985	S	0.3	6.5	7.2		13	
5AMHN052.34	1/9/1986	S	0.3	3	6.8		12.8	
5AMHN052.34	2/10/1986	S	0.3	6.5	6.8		14	
5AMHN052.34	3/10/1986	S	0.3	8	7.2		11.9	
5AMHN052.34	4/7/1986	S	0.3	20	8.17		9.5	
5AMHN052.34	5/14/1986	S	0.3	16.8	7.32		8.4	
5AMHN052.34	6/17/1986	S	0.3	27	7.7		7.3	
5AMHN052.34	7/17/1986	S	0.3	29	7.24		6.1	
5AMHN052.34	8/14/1986	S	0.3	23	6.75		5.8	
5AMHN052.34	9/17/1986	S	0.3	21.5	7.58		7.9	
5AMHN052.34	10/22/1986	S	0.3	16	5.9		6.6	
5AMHN052.34	11/24/1986	S	0.3	8.5	8.06		9.4	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler	Fdt Do Optical
5AMHN052.34	12/15/1986	S	0.3	5	7.91		10.2	
5AMHN052.34	1/20/1987	S	0.3	5.5	7.08		13.2	
5AMHN052.34	2/12/1987	S	0.3	4	7.51		12.7	
5AMHN052.34	3/23/1987	S	0.3	9	7.88		11.1	
5AMHN052.34	4/21/1987	S	0.3	14	7.7		8.5	
5AMHN052.34	5/11/1987	S	0.3	19	7.95		8.6	
5AMHN052.34	6/8/1987	S	0.3	25.6	6.72		5.1	
5AMHN052.34	6/8/1987	S	0.3	25.6	6.72		5	
5AMHN052.34	7/6/1987	S	0.3	26	7.38		6.1	
5AMHN052.34	8/11/1987	S	0.3	28.5	7.27		4.6	
5AMHN052.34	9/16/1987	S	0.3	24.5	7.23		5.8	
5AMHN052.34	10/15/1987	S	0.3	13	7.81		9.6	
5AMHN052.34	11/23/1987	S	0.3	8	7.94		10.6	
5AMHN052.34	12/8/1987	S	0.3	5	7.7		11.2	
5AMHN052.34	1/19/1988	S	0.3	1	7.57		12.4	
5AMHN052.34	2/16/1988	S	0.3	5.3	7.4		12.7	
5AMHN052.34	3/15/1988	S	0.3	8.2	7.89		9.4	
5AMHN052.34	4/12/1988	S	1	12.1	7.57		9.8	
5AMHN052.34	5/11/1988	S	0.3	18.3	7.17		7.8	
5AMHN052.34	6/8/1988	S	0.3	22	7.96		7.2	
5AMHN052.34	7/12/1988	S	0.3	27	6.86		3.7	
5AMHN052.34	8/25/1988	S	0.3	26.1	7.56		3.8	
5AMHN052.34	9/20/1988	S	0.3	23	7.08		4.7	
5AMHN052.34	10/18/1988	S	0.3	11	8.05		9.2	
5AMHN052.34	11/9/1988	S	0.3	8.3	7.19		9.8	
5AMHN052.34	12/19/1988	S	0.3	4.5	8		12.9	
5AMHN052.34	1/31/1989	S	0.3	7.4	6.49		12.4	
5AMHN052.34	2/27/1989	S	0.3					
5AMHN052.34	3/20/1989	S	0.3	12	8.05		10.8	
5AMHN052.34	4/18/1989	S	0.3	15.1	7.48		10.8	
5AMHN052.34	5/23/1989	S	0.3	21	8		8.4	
5AMHN052.34	6/22/1989	S	0.3	24.1	7.77		5.9	
5AMHN052.34	7/24/1989	S	0.3	26.6	7		4.7	
5AMHN052.34	8/15/1989	S	0.3	21.8	7.25		7.5	
5AMHN052.34	9/19/1989	S	0.3	21.7	8.05		5.2	
5AMHN052.34	10/19/1989	S	0.3	16	8.07		7.7	
5AMHN052.34	11/16/1989	S	0.3	13.6	7.88		8.9	
5AMHN052.34	12/28/1989	S	0.3	0.5	7.31		14.3	
5AMHN052.34	1/31/1990	S	0.3	7.6	7.6		11.4	
5AMHN052.34	2/20/1990	S	0.3					
5AMHN052.34	3/20/1990	S	0.3	13.6	6.58		9.2	
5AMHN052.34	4/18/1990	S	0.3	15.3	7.54		8.8	
5AMHN052.34	5/17/1990	S	0.3	19.8	6.59		7.4	
5AMHN052.34	6/19/1990	S	0.3	23.3	7.28		6.1	
5AMHN052.34	7/16/1990	S	0.3	26.3	6.62		3.4	
5AMHN052.34	8/13/1990	S	0.3	24.3	7.63		4.8	
5AMHN052.34	9/13/1990	S	0.3	24.7	6.36		4.1	
5AMHN052.34	10/11/1990	S	0.3	20.24	6.92	4.5		
5AMHN052.34	10/11/1990	B	0.3					
5AMHN052.34	11/27/1990	S	0.3	8.9	6.69	10.3	10.3	
5AMHN052.34	12/5/1990	S	0.3	8.1	7.26	10.59	10.6	
5AMHN052.34	12/5/1990	B	0.3	8.07	7.26	10.59		
5AMHN052.34	1/28/1991	S	0.3					
5AMHN052.34	2/12/1991	S	0.09	6.76	7.69	11.86	11.9	
5AMHN052.34	2/12/1991	B	0.3	6.8	7.69		11.9	
5AMHN052.34	3/28/1991	S	0.09			9.16		
5AMHN052.34	3/28/1991	B	0.3	15.77	6.71	9.16		
5AMHN052.34	4/29/1991	S	0.09	18.33	6.34	8.77	8.8	
5AMHN052.34	4/29/1991	B	0.3					
5AMHN052.34	5/23/1991	S	0.3	20.3	7.16		7.54	
5AMHN052.34	6/19/1991	S	0.3	25.98	6.26		2.82	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler	Fdt Do Optical
5AMHN052.34	7/22/1991	S	0.3	30.28	6.3		2.76	
5AMHN052.34	8/20/1991	S	0.3	26.08	6.52	2.33		
5AMHN052.34	9/19/1991	S	0.3	26.47	6.16	2.53		
5AMHN052.34	9/19/1991	S	0.3					
5AMHN052.34	10/21/1991	S	0.3	13.11	6.3	7.78		
5AMHN052.34	11/25/1991	S	0.3	11.15	6.9	8.75		
5AMHN052.34	12/19/1991	S	0.3	5.62	6.71	10.86		
5AMHN052.34	1/10/1992	S	0.3	1	6	12		
5AMHN052.34	1/16/1992	S	0.3	5.65	6.15	10.93		
5AMHN052.34	2/25/1992	S	0.3	9.21	6.67	10.9		
5AMHN052.34	3/18/1992	S	0.3	8.04	5.5	11.09		
5AMHN052.34	4/28/1992	S	0.3	16.65	6.09	7.18		
5AMHN052.34	5/20/1992	S	0.3	19.33	5.99	5.78		
5AMHN052.34	6/22/1992	S	0.3	21.21	6.01	5.46		
5AMHN052.34	7/13/1992	S	0.3	29.37	6.16	4.14		
5AMHN052.34	8/20/1992	S	0.3	22.26	6.38	8.03		
5AMHN052.34	9/21/1992	S	0.3	21.62	6.8	7.8		
5AMHN052.34	10/20/1992	S	0.3	13.55	6.51	8.05		
5AMHN052.34	11/12/1992	S	0.3	10.27	6.86	8.68		
5AMHN052.34	12/8/1992	S	0.3	5.24	6.93	10.85		
5AMHN052.34	1/19/1993	S	0.3	5.74	6.68	10.73		
5AMHN052.34	2/17/1993	S	0.3	6.15	6.6	11.83		
5AMHN052.34	3/16/1993	S	0.3	4.74	6.02	13.37		
5AMHN052.34	4/14/1993	S	0.3	14.09	6.44	9.65		
5AMHN052.34	5/17/1993	S	0.3	20.09	6.33	6.81		
5AMHN052.34	6/9/1993	S	0.3	21.9	6.15	6		
5AMHN052.34	7/14/1993	S	0.3	29.4	6.23	2.94		
5AMHN052.34	8/11/1993	S	0.3	24.86	6	2.22		
5AMHN052.34	9/23/1993	S	0.3	24.01	6.68	2.39		
5AMHN052.34	10/21/1993	S	0.3	19.06	6.88	6.63		
5AMHN052.34	11/15/1993	S	0.3	12.46	6.74	8.62		
5AMHN052.34	12/15/1993	S	0.3	4.79	6.61	11.52		
5AMHN052.34	1/25/1994	S	0.3	0.48	6.65	12.74		
5AMHN052.34	2/16/1994	S	0.3	4.43	6.47	12.67		
5AMHN052.34	3/14/1994	S	0.3	9.01	6.31	10.76		
5AMHN052.34	4/13/1994	S	0.3	16.34	6.57	8.4		
5AMHN052.34	5/12/1994	S	0.3	17.85	6.53	7.88		
5AMHN052.34	6/13/1994	S	0.3	22.93	6.59	5.72		
5AMHN052.34	7/12/1994	S	0.3	28.38	6.55	2.81		
5AMHN052.34	7/13/1994	S	0.3	28.63	6.55	2.25		
5AMHN052.34	8/4/1994	S	0.3	26.54	6.63	5.37		
5AMHN052.34	9/14/1994	S	0.3	23.29	6.49	4.58		
5AMHN052.34	10/6/1994	S	0.3	18.63	6.63	4.93		
5AMHN052.34	11/3/1994	S	0.3	12.67	6.6	6.07		
5AMHN052.34	12/19/1994	S	0.3	7.16	6.91	10.68		
5AMHN052.34	1/23/1995	S	0.3	6	6.9	10.56		
5AMHN052.34	2/21/1995	S	0.3	7.22	6.77	10.93		
5AMHN052.34	3/8/1995	S	0.3	10.8	6.81	10.21		
5AMHN052.34	4/11/1995	S	0.3	14.96	6.85	8.46		
5AMHN052.34	5/8/1995	S	0.3	16.65	6.61	7.41		
5AMHN052.34	6/6/1995	S	0.3	23.15	6.6	5.44		
5AMHN052.34	7/5/1995	S	0.3	24.22	6.44	6.78		
5AMHN052.34	8/3/1995	S	0.3	29.74	6.62	1.24		
5AMHN052.34	9/6/1995	S	0.3	24.24	6.65	3.54		
5AMHN052.34	10/2/1995	S	0.3	20.82	6.67	3.64		
5AMHN052.34	11/6/1995	S	0.3	12.89	6.41	6.51		
5AMHN052.34	12/6/1995	S	0.3	7.35	6.72	10.45		
5AMHN052.34	1/4/1996	S	0.3	3.23	6.78	12.87		
5AMHN052.34	2/14/1996	S	0.3	3.69	6.41	11.91		
5AMHN052.34	3/28/1996	S	0.3	10.27	6.54	10.22		
5AMHN052.34	4/9/1996	S	0.3	10.77	6.55	10.15		

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler	Fdt Do Optical
5AMHN052.34	5/15/1996	S	0.3	17.18	6.43	7.3		
5AMHN052.34	6/17/1996	S	0.3	24.61	6.62	5.99		
5AMHN052.34	7/16/1996	S	0.3	25.98	6.33	5.31		
5AMHN052.34	8/14/1996	S	0.3	21.1	6.75	7.52		
5AMHN052.34	9/12/1996	S	0.3	22.52	6.44	8.6		
5AMHN052.34	10/28/1996	S	0.3	14.84	6.45	7.76		
5AMHN052.34	11/21/1996	S	0.3	7.72	6.46	10.42		
5AMHN052.34	12/18/1996	S	0.3	7.52	6.39	10.95		
5AMHN052.34	1/29/1997	S	0.3	5.78	6.55	12.07		
5AMHN052.34	2/11/1997	S	0.3	5.13	6.96	12.41		
5AMHN052.34	3/11/1997	S	0.3	10.75	6.94	12.27		
5AMHN052.34	4/24/1997	S	0.3	11.46	6.95	9.82		
5AMHN052.34	5/22/1997	S	0.3	20.23	6.65	7.39		
5AMHN052.34	6/18/1997	S	0.3	22.02	6.5	6.64		
5AMHN052.34	7/16/1997	S	0.3					
5AMHN052.34	8/5/1997	S	0.3	24.39	6.1	5.42		
5AMHN052.34	9/18/1997	S	0.3	22.85	6.54	4.76		
5AMHN052.34	10/15/1997	S	0.3	19.36	6.85	5.51		
5AMHN052.34	11/13/1997	S	0.3	9.72	6.77	9.4		
5AMHN052.34	12/16/1997	S	0.3	4.71	6.99	11.96		
5AMHN052.34	1/13/1998	S	0.3	9.65	6.5	10.3		
5AMHN052.34	2/10/1998	S	0.3	5.88	6.89	11.62		
5AMHN052.34	3/9/1998	S	0.3	12.82	6.35	11.25		
5AMHN052.34	4/9/1998	S	0.3	15.61	6.64	8.99		
5AMHN052.34	5/21/1998	S	0.3	21.59	6.8	7.95		
5AMHN052.34	6/17/1998	S	0.3	23.93	6.71	5.97		
5AMHN052.34	7/23/1998	S	0.3	28.94	6.59	4.29		
5AMHN052.34	8/26/1998	S	0.3	26.34	6.32	3		
5AMHN052.34	9/29/1998	S	0.3	24.35	6.45	3.05		
5AMHN052.34	10/29/1998	S	0.3	15.22	6.64	6.35		
5AMHN052.34	11/30/1998	S	0.3	10	6.55	8.89		
5AMHN052.34	12/17/1998	S	0.3	6.37	6.41	11.2		
5AMHN052.34	1/20/1999	S	0.3	6.91	6.31	10.98		
5AMHN052.34	2/17/1999	S	0.3	6.62	6.57	11.28		
5AMHN052.34	3/29/1999	S	0.3	11.96	6.43	9.73		
5AMHN052.34	4/15/1999	S	0.3	13.97	6.45	7.9		
5AMHN052.34	5/24/1999	S	0.3	21.14	6.6	6.21		
5AMHN052.34	6/17/1999	S	0.3	22.89	6.62	5.02		
5AMHN052.34	7/13/1999	S	0.3	23.93	6.34	2.53		
5AMHN052.34	8/12/1999	S	0.3	26.8	6.43	2.48		
5AMHN052.34	9/2/1999	S	0.3	22.15	6.04	3.97		
5AMHN052.34	10/26/1999	S	0.3	10.81	6.42	9.46		
5AMHN052.34	11/8/1999	S	0.3	10.04	6.32	8.31		
5AMHN052.34	12/21/1999	S	0.3	7.45	6.44	10.71	10.6	
5AMHN052.34	1/12/2000	S	0.3	9.47	6.87	11.8		
5AMHN052.34	2/24/2000	S	0.3					
5AMHN052.34	3/20/2000	S	0.3	10.85	6.3	10.28		
5AMHN052.34	4/17/2000	S	0.3	16.36	6.41	9.18		
5AMHN052.34	5/15/2000	S	0.3	22.32	6.65	7.86		
5AMHN052.34	6/26/2000	S	0.3	26.16	6.63	4.62		
5AMHN052.34	7/24/2000	S	0.3	23.61	5.91	5.94		
5AMHN052.34	8/14/2000	S	0.3	25.07	5.89	5.7		
5AMHN052.34	9/7/2000	S	0.3	20.72	6.23	6.98		
5AMHN052.34	10/19/2000	S	0.3	15.26	6.42	7.95		
5AMHN052.34	11/15/2000	S	0.3	11.2	6.95	8.27		
5AMHN052.34	12/14/2000	S	0.3	3.59	6.67	12.95		
5AMHN052.34	1/9/2001	S	0.3	0.61	6.63	12.21		
5AMHN052.34	2/12/2001	S	0.3	7.43	6.97	10.65	11.2	
5AMHN052.34	3/8/2001	S	0.3	6.52	6.46	11.3		
5AMHN052.34	4/9/2001	S	0.3	16.55	6.35	8.21		
5AMHN052.34	6/20/2001	S	0.3	23.68	6.27	5.7		

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler	Fdt Do Optical
5AMHN052.34	8/27/2001	S	0.3	25.77	6.42	5.64		
5AMHN052.34	10/9/2001	S	0.3	16.63	6.56	6.95		
5AMHN052.34	12/20/2001	S	0.3	10.09	6.65	8.97		
5AMHN052.34	2/25/2002	S	0.3	8.89	6.96	10.41		
5AMHN052.34	4/18/2002	S	0.3	23.54	6.66	5.13		
5AMHN052.34	7/2/2002	S	0.3	27.35	6.77	3.32		
5AMHN052.34	7/30/2002	S	0.3	29.05	6.61	4.04		
5AMHN052.34	9/5/2002	S	0.3	24.8	6.65	3.38		
5AMHN052.34	11/25/2002	S	0.3	7.92	6.51	10.9		
5AMHN052.34	1/30/2003	S	0.3	0.69	7.02	13.7		
5AMHN052.34	3/27/2003	S	0.3	14.57	6.69	9.42		
5AMHN052.34	5/22/2003	S	0.3	16.11	6.35	9.39		
5AMHN052.34	7/14/2003	S	0.3	26.05	6.93	5.55		
5AMHN052.34	9/29/2003	S	0.3	20.17	6.62	6.63		
5AMHN052.34	12/1/2003	S	0.3	8.01	6.89	10.74		
5AMHN052.34	1/29/2004	S	0.3	0.4	7.04	13.74		
5AMHN052.34	3/16/2004	S	0.3	10.36	6.62	10.37		
5AMHN052.34	5/25/2004	S	0.3	26.13	6.6	5.28		
5AMHN052.34	8/24/2004	S	0.3	23.4	6.65	6.45		
5AMHN052.34	10/13/2004	S	0.3	15.46	6.76	8.57		
5AMHN052.34	12/8/2004	S	0.3	9.1	6.85	10.78		
5AMHN052.34	2/14/2005	S	0.3	6.2	7.4	11.49		
5AMHN052.34	4/25/2005	S	0.3	15.73	6.91	8.43		
5AMHN052.34	6/7/2005	S	0.3	21.4	6.91	6.52		
5AMHN052.34	8/4/2005	S	0.3	27.12	6.67	3.2		
5AMHN052.34	10/24/2005	S	0.3	16.2	7.28	4.66		
5AMHN052.34	12/19/2005	S	0.3	4.65	6.98	12.27		
5AMHN052.34	2/22/2006	S	0.3	5.58	7.11	12.52		
5AMHN052.34	4/13/2006	S	0.3	16.1	7.3	8.5		
5AMHN052.34	4/13/2006	S	0					
5AMHN052.34	6/26/2006	S	0.3	25.3	6.6	3.2		
5AMHN052.34	8/17/2006	S	0.3	25.8	7	2.9		
5AMHN052.34	10/18/2006	S	0.3	13.2	6.7	8.3		
5AMHN052.34	12/19/2006	S	0.3	6.5	6.6	13.4		
5AMHN052.34	1/16/2007	S	0.3	10.5	6.9	10.6		
5AMHN052.34	3/8/2007	S	0.3	7.1	7	11.4		
5AMHN052.34	5/16/2007	S	0.3	19.4	7	6.7		
5AMHN052.34	7/12/2007	S	0.3	27.7	7.1			3.2
5AMHN052.34	9/13/2007	S	0.3	25.7	7	3.1		
5AMHN052.34	11/19/2007	S	0.3	9.6	7.1	6.9		
5AMHN052.34	1/14/2008	S	0.3	7.5	7.5	10		
5AMHN052.34	3/3/2008	S	0.3	8	7.3	11.8		
5AMHN052.34	5/13/2008	S	0.3	14.5	6.9	10.1		
5AMHN052.34	7/8/2008	S	0.3	25.7	6.8	2.4		
5AMHN052.34	9/24/2008	S	0.3	20.9	7	4.9		
5AMHN052.34	11/17/2008	S	0.3	12.1	6.9	8		
5AMHN052.34	2/4/2009	S	0.3	4.1	6.8	12.4		
5AMHN052.34	4/7/2009	S	0.3	14.6	7	8.3		
5AMHN052.34	6/3/2009	S	0.3	25.4	6.9	4.9		
5AMHN052.34	8/4/2009	S	0.3	27.2	6.8	3.1		
5AMHN052.34	10/6/2009	S	0.3	18.6	7.4	6.4		
5AMHN052.34	12/2/2009	S	0.3	8.3	7.3	10.9		
5AMHN052.34	1/5/2010	S	0.3	0.8	7.3	13.7		
5AMHN052.34	3/2/2010	S	0.3	5.3	7.3	12.2		
5AMHN052.34	5/12/2010	S	0.3	19.1	7.1	5.8		
5AMHN052.34	7/12/2010	S	0.3	27.9	6.9	2.6		
5AMHN052.34	9/15/2010	S	0.3	23.1	6.9	3.1		
5AMHN052.34	11/8/2010	S	0.3	10.3	6.8	9.8		
5AMHN052.34	2/7/2011	S	0.3	5.1	7.3	13.1		
5AMHN052.34	4/6/2011	S	0.3	12.8	7	9.1		
5AMHN052.34	6/8/2011	S	0.3	26.2	7.1	4.7		

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler	Fdt Do Optical
5AMHN052.34	8/15/2011	S	0.3	27.1	7.2	4		
5AMHN052.34	10/5/2011	S	0.3	18.9	6.7	5.7		
<b>90th Percentile</b>				<b>26.1</b>	<b>7.5</b>			
<b>10th Percentile</b>				<b>4.9</b>	<b>6.4</b>			

					00900	
					HARDNESS, TOTAL (MG/L AS CaCO3)	
Sta Id	Collection Date Time	Depth Desc	Depth	Container Id Desc	Value	Com Code
5AMHN052.34	12/19/1988 14:05	S	0.3	R	26	
5AMHN052.34	02/27/1989 10:10	S	0.3	R	18	
5AMHN052.34	04/18/1989 11:10	S	0.3	R	16	
5AMHN052.34	05/23/1989 16:00	S	0.3	R	24	
5AMHN052.34	06/22/1989 13:20	S	0.3	R	24	
5AMHN052.34	07/24/1989 11:00	S	0.3	R	26	
5AMHN052.34	09/19/1989 11:05	S	0.3	R	26	
5AMHN052.34	10/19/1989 10:45	S	0.3	R	30	
5AMHN052.34	11/16/1989 10:50	S	0.3	R	24	
5AMHN052.34	12/28/1989 10:35	S	0.3	R	24	
5AMHN052.34	01/31/1990 16:00	S	0.3	R	19	
5AMHN052.34	02/20/1990 11:20	S	0.3	R	22	
5AMHN052.34	03/20/1990 10:40	S	0.3	R	24	
5AMHN052.34	04/18/1990 13:20	S	0.3	R	22	
5AMHN052.34	05/17/1990 10:50	S	0.3	R	28	
5AMHN052.34	06/19/1990 11:10	S	0.3	R	27	
5AMHN052.34	07/16/1990 13:45	S	0.3	R	28	
5AMHN052.34	08/13/1990 10:45	S	0.3	R	24	
5AMHN052.34	09/13/1990 11:30	S	0.3	R	42	
5AMHN052.34	10/11/1990 13:10	S	0.3	R	30	
5AMHN052.34	11/27/1990 12:00	S	0.3	R	28	
5AMHN052.34	12/05/1990 10:40	S	0.3	R	28	
5AMHN052.34	01/28/1991 12:00	S	0.3	R	32	
5AMHN052.34	02/12/1991 11:10	B	0.3	R	28	
5AMHN052.34	02/12/1991 11:10	S	0.09	R	28	
5AMHN052.34	03/28/1991 10:58	B	0.3	R	32	
5AMHN052.34	04/29/1991 12:40	S	0.09	R	32	
5AMHN052.34	05/23/1991 11:20	S	0.3	R	30	
5AMHN052.34	06/19/1991 12:00	S	0.3	R	48	
5AMHN052.34	07/22/1991 12:50	S	0.3	R	40	
5AMHN052.34	08/20/1991 10:45	S	0.3	R	26	
5AMHN052.34	09/19/1991 11:55	S	0.3	R	50	
5AMHN052.34	11/25/1991 10:23	S	0.3	R	26	
5AMHN052.34	12/19/1991 11:00	S	0.3	R	34	
5AMHN052.34	01/16/1992 12:08	S	0.3	R	22	
5AMHN052.34	02/25/1992 09:50	S	0.3	R	26	
5AMHN052.34	03/18/1992 10:45	S	0.3	R	15	
5AMHN052.34	04/28/1992 12:20	S	0.3	R	26	
5AMHN052.34	05/20/1992 10:10	S	0.3	R	26	
5AMHN052.34	06/22/1992 10:45	S	0.3	R	34	
5AMHN052.34	07/13/1992 12:37	S	0.3	R	36	
5AMHN052.34	08/20/1992 10:49	S	0.3	R	26	
5AMHN052.34	09/21/1992 10:40	S	0.3	R	36	
5AMHN052.34	10/20/1992 12:27	S	0.3	R	34	
5AMHN052.34	11/12/1992 10:30	S	0.3	R	35	
5AMHN052.34	12/08/1992 11:15	S	0.3	R	27	
5AMHN052.34	01/19/1993 12:11	S	0.3	R	22	
5AMHN052.34	02/17/1993 11:21	S	0.3	R	26	

					00900	
					HARDNESS, TOTAL (MG/L AS CaCO3)	
Sta Id	Collection Date Time	Depth Desc	Depth	Container Id Desc	Value	Com Code
5AMHN052.34	03/16/1993 11:11	S	0.3	R	20	
5AMHN052.34	04/14/1993 10:33	S	0.3	R	24	
5AMHN052.34	05/17/1993 10:55	S	0.3	R	22	
5AMHN052.34	07/14/1993 11:50	S	0.3	R	40	
5AMHN052.34	08/11/1993 10:30	S	0.3	R	26	
5AMHN052.34	09/23/1993 12:55	S	0.3	R	40	
5AMHN052.34	10/21/1993 12:11	S	0.3	R	46	
5AMHN052.34	11/15/1993 11:22	S	0.3	R	40	
5AMHN052.34	12/15/1993 11:00	S	0.3	R	34	
5AMHN052.34	01/25/1994 11:55	S	0.3	R	24	
5AMHN052.34	02/16/1994 12:00	S	0.3	R	16	
5AMHN052.34	03/14/1994 11:56	S	0.3	R	18	
5AMHN052.34	04/13/1994 13:00	S	0.3	R	21	
5AMHN052.34	05/12/1994 10:30	S	0.3	R	24	
5AMHN052.34	06/13/1994 11:45	S	0.3	R	26	
5AMHN052.34	07/12/1994 14:14	S	0.3	R	26	
5AMHN052.34	08/04/1994 14:00	S	0.3	R	22	
5AMHN052.34	09/14/1994 12:22	S	0.3	R	22	
5AMHN052.34	10/06/1994 13:12	S	0.3	R	20	
5AMHN052.34	11/03/1994 11:11	S	0.3	R	26	
5AMHN052.34	12/19/1994 10:22	S	0.3	R	26	
5AMHN052.34	01/23/1995 13:22	S	0.3	R	23	
5AMHN052.34	02/21/1995 12:22	S	0.3	R	27	
5AMHN052.34	03/08/1995 13:00	S	0.3	R	24	
5AMHN052.34	04/11/1995 13:49	S	0.3	R	31	
5AMHN052.34	05/08/1995 10:30	S	0.3	R	24	
5AMHN052.34	06/06/1995 10:44	S	0.3	R	30	
5AMHN052.34	07/05/1995 15:30	S	0.3	R	24	
5AMHN052.34	08/03/1995 12:45	S	0.3	R	42	
5AMHN052.34	09/06/1995 09:00	S	0.3	R	32	
5AMHN052.34	10/02/1995 12:34	S	0.3	R	40	
5AMHN052.34	11/06/1995 10:40	S	0.3	R	30	
5AMHN052.34	12/06/1995 15:15	S	0.3	R	27	
5AMHN052.34	01/04/1996 13:41	S	0.3	R	26	
5AMHN052.34	02/14/1996 10:30	S	0.3	R	21	
5AMHN052.34	03/28/1996 12:30	S	0.3	R	28	
5AMHN052.34	04/09/1996 15:00	S	0.3	R	22	
5AMHN052.34	05/15/1996 12:44	S	0.3	R	24	
5AMHN052.34	06/17/1996 11:31	S	0.3	R	22	
5AMHN052.34	07/16/1996 13:52	S	0.3	R	25	
5AMHN052.34	08/14/1996 11:22	S	0.3	R	22	
5AMHN052.34	09/12/1996 09:00	S	0.3	R	22	
5AMHN052.34	10/28/1996 11:30	S	0.3	R	35	
5AMHN052.34	11/21/1996 10:40	S	0.3	R	26	
5AMHN052.34	12/18/1996 09:30	S	0.3	R	22	
5AMHN052.34	01/29/1997 13:40	S	0.3	R	25	
5AMHN052.34	02/11/1997 09:45	S	0.3	R	24	
5AMHN052.34	03/11/1997 09:45	S	0.3	R	24.3	

					00900	
					HARDNESS, TOTAL (MG/L AS CaCO3)	
Sta Id	Collection Date Time	Depth Desc	Depth	Container Id Desc	Value	Com Code
5AMHN052.34	04/24/1997 12:11	S	0.3	R	24.3	
5AMHN052.34	05/22/1997 11:19	S	0.3	R	25.7	
5AMHN052.34	06/18/1997 09:44	S	0.3	R	26.3	
5AMHN052.34	07/16/1997 12:00	S	0.3	R	24.1	
5AMHN052.34	08/05/1997 10:20	S	0.3	R	19.6	
5AMHN052.34	09/18/1997 14:30	S	0.3	R	22.5	
5AMHN052.34	10/15/1997 10:35	S	0.3	R	26.1	
5AMHN052.34	11/13/1997 13:45	S	0.3	R	65.2	
5AMHN052.34	12/16/1997 11:30	S	0.3	R	27.7	
5AMHN052.34	01/13/1998 13:00	S	0.3	R	17.6	
5AMHN052.34	02/10/1998 11:30	S	0.3	R	22.2	
5AMHN052.34	03/09/1998 13:15	S	0.3	R	22	
5AMHN052.34	04/09/1998 11:20	S	0.3	R	15	
5AMHN052.34	05/21/1998 13:00	S	0.3	R	20.3	
5AMHN052.34	06/17/1998 07:45	S	0.3	R	22.7	
5AMHN052.34	07/23/1998 10:10	S	0.3	R	27.1	
5AMHN052.34	08/26/1998 11:15	S	0.3	R	19.6	
5AMHN052.34	09/29/1998 11:11	S	0.3	R	19.3	
5AMHN052.34	10/29/1998 11:50	S	0.3	R	28	
5AMHN052.34	11/30/1998 12:25	S	0.3	R	26	
5AMHN052.34	12/17/1998 10:55	S	0.3	R	27.1	
5AMHN052.34	01/20/1999 12:15	S	0.3	R	46	
5AMHN052.34	02/17/1999 10:10	S	0.3	R	44	
5AMHN052.34	03/29/1999 13:30	S	0.3	R	20	
5AMHN052.34	04/15/1999 12:00	S	0.3	R	28	
5AMHN052.34	05/24/1999 13:45	S	0.3	R	36	
5AMHN052.34	06/17/1999 11:33	S	0.3	R	25.9	
5AMHN052.34	07/13/1999 11:33	S	0.3	R	13	
5AMHN052.34	08/12/1999 10:50	S	0.3	R	17.5	
5AMHN052.34	09/02/1999 13:30	S	0.3	R	13.6	
5AMHN052.34	11/08/1999 12:00	S	0.3	R	16.2	
5AMHN052.34	12/21/1999 15:22	S	0.3	R	24	
5AMHN052.34	01/12/2000 14:30	S	0.3	R	25.9	
5AMHN052.34	02/24/2000 10:00	S	0.3	R	14	
5AMHN052.34	03/20/2000 13:20	S	0.3	R	19	
5AMHN052.34	04/17/2000 12:15	S	0.3	R	17	
5AMHN052.34	05/15/2000 14:40	S	0.3	R	11	
5AMHN052.34	06/26/2000 12:05	S	0.3	R	24.9	
5AMHN052.34	07/24/2000 13:00	S	0.3	R	22.5	
5AMHN052.34	08/14/2000 12:00	S	0.3	R	21.7	
5AMHN052.34	09/07/2000 13:00	S	0.3	R	13.9	
5AMHN052.34	10/19/2000 12:15	S	0.3	R	24	
5AMHN052.34	11/15/2000 12:20	S	0.3	R	28.1	
5AMHN052.34	12/14/2000 11:10	S	0.3	R	19.5	
5AMHN052.34	01/09/2001 11:30	S	0.3	R	24.2	
5AMHN052.34	02/12/2001 09:20	S	0.3	R	21.6	
5AMHN052.34	03/08/2001 11:45	S	0.3	R	12.5	
5AMHN052.34	04/09/2001 09:35	S	0.3	R	7.9	

					00900	
					HARDNESS, TOTAL (MG/L AS CaCO3)	
Sta Id	Collection Date Time	Depth Desc	Depth	Container Id Desc	Value	Com Code
5AMHN052.34	06/20/2001 12:10	S	0.3	R	15.5	
5AMHN052.34	08/27/2001 13:30	S	0.3	R	6.9	
5AMHN052.34	10/09/2001 13:40	S	0.3	R	34.1	
5AMHN052.34	12/20/2001 12:50	S	0.3	R	12.8	
5AMHN052.34	02/25/2002 13:20	S	0.3	R	35	
5AMHN052.34	04/18/2002 12:30	S	0.3	R	25.3	
5AMHN052.34	07/02/2002 14:30	S	0.3	R	52.2	
5AMHN052.34	07/30/2002 13:15	S	0.3	R	42	
5AMHN052.34	09/05/2002 13:30	S	0.3	R	18.5	
5AMHN052.34	11/25/2002 12:00	S	0.3	R	10	U
5AMHN052.34	01/30/2003 13:10	S	0.3	R	17.3	
5AMHN052.34	03/27/2003 13:25	S	0.3	R	19.8	
5AMHN052.34	07/14/2003 14:30	S	0.3	R	33.2	
5AMHN052.34	09/29/2003 13:20	S	0.3	R	15.8	
5AMHN052.34	12/01/2003 12:25	S	0.3	R	29	
5AMHN052.34	01/29/2004 13:23	S	0.3	R	31	
5AMHN052.34	03/16/2004 11:45	S	0.3	R	21.5	
5AMHN052.34	05/25/2004 11:30	S	0.3	R	26	
5AMHN052.34	08/24/2004 12:40	S	0.3	R	10	U
5AMHN052.34	10/13/2004 13:30	S	0.3	R	32	
5AMHN052.34	12/08/2004 12:22	S	0.3	R	24	
5AMHN052.34	02/14/2005 11:00	S	0.3	R	22	
5AMHN052.34	04/25/2005 12:05	S	0.3	R	26.8	
5AMHN052.34	06/07/2005 12:15	S	0.3	R	30	
5AMHN052.34	08/04/2005 12:40	S	0.3	R	24	
5AMHN052.34	10/24/2005 13:40	S	0.3	R	18	
5AMHN052.34	12/19/2005 13:22	S	0.3	R	17	
5AMHN052.34	02/22/2006 12:00	S	0.3	R	23	
5AMHN052.34	04/13/2006 12:25	S	0.3	S1	30	
5AMHN052.34	06/26/2006 13:05	S	0.3	R	20	
5AMHN052.34	08/17/2006 10:55	S	0.3	R	31	
5AMHN052.34	10/18/2006 11:15	S	0.3	R	20	
5AMHN052.34	12/19/2006 12:15	S	0.3	R	22	
5AMHN052.34	01/16/2007 11:20	S	0.3	R	20	
<b>Average</b>					<b>26</b>	

**Attachment F: Effluent Water Quality Criteria Monitoring  
data, DMR data**

Application (EPA Form 2A) data

Parameter	Maximum Daily Value		Average Daily Value		
	Value	Units	Value	Units	No. Samples
pH (minimum)	6.34	S.U.			
pH (maximum)	7.80	S.U.			
Flow Rate	2.569	MGD	0.801	MGD	365
Temperature (Winter)	19.9	°C	15.1	NA	151
Temperature (Summer)	29.4	°C	24.1	NA	214

Pollutant	Maximum Daily Discharge		Average Daily Discharge			QL
	Conc.	Units	Conc.	Units	No. Samples	
BOD <sub>5</sub>	26.1	mg/L	3.58	mg/l	156	5.0
<i>E. coli</i>	17600	N/100 mL	56	N/100 ml	261	1/100 mL
TSS	11.1	mg/L	7.3	mg/l	12	2.0 mg/L
Ammonia (as N)	<QL	mg/L	<QL	mg/L	3	0.10
TRC	<QL	mg/L	<QL	mg/L	3	0.10
Dissolved Oxygen	12.1	mg/L	9.4	mg/L	365	+/- 0.03 mg/L
TKN	5.23	mg/L	3.09	mg/L	3	0.50
Nitrate + Nitrite Nitrogen	8.79	mg/L	6.21	mg/L	3	0.05
Oil and Grease	5.0	mg/L	1.67	mg/L	3	5.0
Total Phosphorus	3.05	mg/L	1.96	mg/L	3	0.10
Total Dissolved Solids (TDS)	1250	mg/L	897	mg/L	3	10

Note: The high maximum *E. coli* count is due to an upset that occurred at the plant during the fourth quarter of 2011. Please refer to the Site Inspection Report and the Compliance Inspection Report in **Attachment D** for specific details regarding the upset. The facility was issued a NOV for the limitation violations on 12/8/2011 and has since come back into compliance with the permit. The December 2011 NOV is the only enforcement action that the facility has received during the course of the 2007 permit term.

There are no aquatic life criteria for total dissolved solids. There is a human health (public water supply) criterion to maintain acceptable taste, odor, and aesthetic quality of drinking water that applies at the drinking water intake. This criterion of 500,000 mg/L far exceeds the TDS concentration reported on the application.

The facility is not located in the Chesapeake Bay watershed and is therefore not required to register for coverage under the General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia. Further evaluation of nutrients phosphorus and nitrogen is not warranted.

**ATTACHMENT A**  
**DEPARTMENT OF ENVIRONMENTAL QUALITY**  
**WATER QUALITY CRITERIA MONITORING**

CASRN#	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL <sup>(1)</sup>	REPORTING RESULTS	SAMPLE TYPE <sup>(2)</sup>	SAMPLE FREQUENCY
<b>METALS</b>						
7440-36-0	Antimony, dissolved	(3)	1.4	0.60 ug/l	G or C	1/5 YR
7440-38-2	Arsenic, dissolved	(3)	1.0	0.69 ug/l	G or C	1/5 YR
7440-43-9	Cadmium, dissolved	(3)	0.3	0.33 ug/l	G or C	1/5 YR
16065-83-1	Chromium III, dissolved <sup>(8)</sup>	(3)	3.6	0.50 ug/l	G or C	1/5 YR
18540-29-9	Chromium VI, dissolved <sup>(8)</sup>	(3)	1.6	0.50 ug/l	G or C	1/5 YR
7440-50-8	Copper, dissolved	(3)	0.50	5.6 ug/l	G or C	1/5 YR
7439-92-1	Lead, dissolved	(3)	0.50	0.50 ug/l	G or C	1/5 YR
7439-97-6	Mercury, dissolved	(3)	1.0	N/D	G or C	1/5 YR
7440-02-0	Nickel, dissolved	(3)	0.94	2.3 ug/l	G or C	1/5 YR
7782-49-2	Selenium, Total Recoverable	(3)	2.0	< 5.0 ug/l	G or C	1/5 YR
7440-22-4	Silver, dissolved	(3)	0.20	< 0.5 ug/l	G or C	1/5 YR
7440-28-0	Thallium, dissolved	(4)	(5)	< 0.10 ug/l	G or C	1/5 YR
7440-66-6	Zinc, dissolved	(3)	3.6	47.0 ug/l	G or C	1/5 YR
<b>PESTICIDES/PCB'S</b>						
309-00-2	Aldrin	608	0.05	< .005 ug/l	G or C	1/5 YR
57-74-9	Chlordane	608	0.2	< 0.2 ug/l	G or C	1/5 YR
2921-88-2	Chlorpyrifos (synonym = Dursban)	(4)	(5)	< 0.2 ug/l	G or C	1/5 YR
72-54-8	DDD	608	0.1	< 0.1 ug/l	G or C	1/5 YR
72-55-9	DDE	608	0.1	< QL	G or C	1/5 YR
50-29-3	DDT	608	0.1	< 0.1 ug/l	G or C	1/5 YR
8065-48-3	Demeton	(4)	(5)	< 1.0 ug/l	G or C	1/5 YR
333-41-5	Diazinon	(4)	(5)	< 1.0 ug/l	G or C	1/5 YR
60-57-1	Dieldrin	608	0.1	< .005 ug/l	G or C	1/5 YR
959-98-8	Alpha-Endosulfan	608	0.1	< 0.1 ug/l	G or C	1/5 YR
33213-65-9	Beta-Endosulfan	608	0.1	< .04 ug/l	G or C	1/5 YR
1031-07-8	Endosulfan Sulfate	608	0.1	< .01 ug/l	G or C	1/5 YR

CASRN#	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL <sup>(1)</sup>	REPORTING RESULTS	SAMPLE TYPE <sup>(2)</sup>	SAMPLE FREQUENCY
72-20-8	Endrin	608	0.1	< 0.1 ug/l	G or C	1/5 YR
7421-93-4	Endrin Aldehyde	(4)	(5)	< 0.2 ug/l	G or C	1/5 YR
86-50-0	Guthion	(4)	(5)	< 1.0 ug/l	G or C	1/5 YR
76-44-8	Heptachlor	608	0.05	< 0.05 ug/l	G or C	1/5 YR
1024-57-3	Heptachlor Epoxide	(4)	(5)	< 0.2 ug/l	G or C	1/5 YR
319-84-6	Hexachlorocyclohexane Alpha-BHC	608	(5)	< 0.02 ug/l	G or C	1/5 YR
319-85-7	Hexachlorocyclohexane Beta-BHC	608	(5)	< 0.05 ug/l	G or C	1/5 YR
58-89-9	Hexachlorocyclohexane Gamma-BHC or Lindane	608	(5)	< 0.02 ug/l	G or C	1/5 YR
143-50-0	Kepone	(9)	(5)	ND ug/l	G or C	1/5 YR
121-75-5	Malathion	(4)	(5)	< 1.0 ug/l	G or C	1/5 YR
72-43-5	Methoxychlor	(4)	(5)	< 2.0 ug/l	G or C	1/5 YR
2385-85-5	Mirex	(4)	(5)	< 0.1 ug/l	G or C	1/5 YR
56-38-2	Parathion	(4)	(5)	< 1.0 ug/l	G or C	1/5 YR
1336-36-3	PCB Total	608	7.0	< 7.0 ug/l	G or C	1/5 YR
8001-35-2	Toxaphene	608	5.0	< 3.0 ug/l	G or C	1/5 YR
<b>BASE NEUTRAL EXTRACTABLES</b>						
83-32-9	Acenaphthene	625	10.0	< 5.0 ug/l	G or C	< 5.0 ug/l 1/5 YR
120-12-7	Anthracene	625	10.0	< 5.0 ug/l	G or C	1/5 YR
92-87-5	Benzidine	(4)	(5)	< 5.0 ug/l	G or C	1/5 YR
56-55-3	Benzo (a) anthracene	625	10.0	< 5.0 ug/l	G or C	1/5 YR
205-99-2	Benzo (b) fluoranthene	625	10.0	< 5.0 ug/l	G or C	1/5 YR
207-08-9	Benzo (k) fluoranthene	625	10.0	< 5.0 ug/l	G or C	1/5 YR
50-32-8	Benzo (a) pyrene	625	10.0	< 5.0 ug/l	G or C	1/5 YR
111-44-4	Bis 2-Chloroethyl Ether	(4)	(5)	< 5.0 ug/l	G or C	1/5 YR
108-60-1	Bis 2-Chloroisopropyl Ether	(4)	(5)	< 5.0 ug/l	G or C	1/5 YR
85-68-7	Butyl benzyl phthalate	625	10.0	< 5.0 ug/l	G or C	1/5 YR
91-58-7	2-Chloronaphthalene	(4)	(5)	< 5.0 ug/l	G or C	1/5 YR
218-01-9	Chrysene	625	10.0	< 5.0 ug/l	G or C	1/5 YR
53-70-3	Dibenz(a,h)anthracene	625	20.0	< 5.0 ug/l	G or C	1/5 YR

CASRN#	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL <sup>(1)</sup>	REPORTING RESULTS	SAMPLE TYPE <sup>(2)</sup>	SAMPLE FREQUENCY
84-74-2	Dibutyl phthalate (synonym = Di-n-Butyl Phthalate)	625	10.0	< 5.0 ug/l	G or C	1/5 YR
95-50-1	1,2-Dichlorobenzene	624	10.0	ND	G or C	1/5 YR
541-73-1	1,3-Dichlorobenzene	624	10.0	ND	G or C	1/5 YR
106-46-7	1,4-Dichlorobenzene	624	10.0	ND	G or C	1/5 YR
91-94-1	3,3-Dichlorobenzidine	(4)	(5)	< 5.0 ug/l	G or C	1/5 YR
84-66-2	Diethyl phthalate	625	10.0	< 5.0 ug/l	G or C	1/5 YR
117-81-7	Bis-2-ethylhexyl phthalate	625	10.0	< 5.0 ug/l	G or C	1/5 YR
131-11-3	Dimethyl phthalate	(4)	(5)	< 5.0 ug/l	G or C	1/5 YR
121-14-2	2,4-Dinitrotoluene	625	10.0	< 5.0 ug/l	G or C	1/5 YR
122-66-7	1,2-Diphenylhydrazine	(4)	(5)	< 5.0 ug/l	G or C	1/5 YR
206-44-0	Fluoranthene	625	10.0	< 5.0 ug/l	G or C	1/5 YR
86-73-7	Fluorene	625	10.0	< 5.0 ug/l	G or C	1/5 YR
118-74-1	Hexachlorobenzene	(4)	(5)	< 5.0 ug/l	G or C	1/5 YR
87-68-3	Hexachlorobutadiene	(4)	(5)	< 5.0 ug/l	G or C	1/5 YR
77-47-4	Hexachlorocyclopentadiene	(4)	(5)	< 5.0 ug/l	G or C	1/5 YR
67-72-1	Hexachloroethane	(4)	(5)	< 5.0 ug/l	G or C	1/5 YR
193-39-5	Indeno(1,2,3-cd)pyrene	625	20.0	< 5.0 ug/l	G or C	1/5 YR
78-59-1	Isophorone	625	10.0	< 5.0 ug/l	G or C	1/5 YR
98-95-3	Nitrobenzene	625	10.0	< 5.0 ug/l	G or C	1/5 YR
62-75-9	N-Nitrosodimethylamine	(4)	(5)	< 5.0 ug/l	G or C	1/5 YR
621-64-7	N-Nitrosodi-n-propylamine	(4)	(5)	< 5.0 ug/l	G or C	1/5 YR
86-30-6	N-Nitrosodiphenylamine	(4)	(5)	< 5.0 ug/l	G or C	1/5 YR
129-00-0	Pyrene	625	10.0	< 5.0 ug/l	G or C	1/5 YR
120-82-1	1,2,4-Trichlorobenzene	625	10.0	< 5.0 ug/l	G or C	1/5 YR
<b>VOLATILES</b>						
107-02-8	Acrolein	(4)	(5)	ND	G	1/5 YR
107-13-1	Acrylonitrile	(4)	(5)	ND	G	1/5 YR
71-43-2	Benzene	624	10.0	ND	G	1/5 YR
75-25-2	Bromoform	624	10.0	ND	G	1/5 YR

CASRN#	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL <sup>(1)</sup>	REPORTING RESULTS	SAMPLE TYPE <sup>(2)</sup>	SAMPLE FREQUENCY
56-23-5	Carbon Tetrachloride	624	10.0	ND	G	1/5 YR
108-90-7	Chlorobenzene (synonym = monochlorobenzene)	624	50.0	ND	G	1/5 YR
124-48-1	Chlorodibromomethane	624	10.0	ND	G	1/5 YR
67-66-3	Chloroform	624	10.0	ND	G	1/5 YR
75-09-2	Dichloromethane (synonym = methylene chloride)	624	20.0	ND	G	1/5 YR
75-27-4	Dichlorobromomethane	624	10.0	ND	G	1/5 YR
107-06-2	1,2-Dichloroethane	624	10.0	ND	G	1/5 YR
75-35-4	1,1-Dichloroethylene	624	10.0	ND	G	1/5 YR
156-60-5	1,2-trans-dichloroethylene	(4)	(5)	ND	G	1/5 YR
78-87-5	1,2-Dichloropropane	(4)	(5)	ND	G	1/5 YR
542-75-6	1,3-Dichloropropene	(4)	(5)	ND	G	1/5 YR
100-41-4	Ethylbenzene	624	10.0	ND	G	1/5 YR
74-83-9	Methyl Bromide	(4)	(5)	ND	G	1/5 YR
79-34-5	1,1,1,2-Tetrachloroethane	(4)	(5)	ND	G	1/5 YR
127-18-4	Tetrachloroethylene	624	10.0	ND	G	1/5 YR
10-88-3	Toluene	624	10.0	ND	G	1/5 YR
79-00-5	1,1,2-Trichloroethane	(4)	(5)	ND	G	1/5 YR
79-01-6	Trichloroethylene	624	10.0	ND	G	1/5 YR
75-01-4	Vinyl Chloride	624	10.0	ND	G	1/5 YR

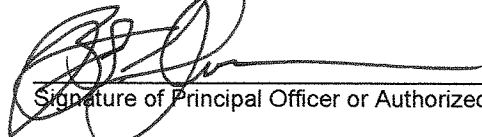
### ACID EXTRACTABLES <sup>(6)</sup>

95-57-8	2-Chlorophenol	625	10.0	< 5.0 ug/l	G or C	1/5 YR
120-83-2	2,4 Dichlorophenol	625	10.0	< 5.0 ug/l	G or C	1/5 YR
105-67-9	2,4 Dimethylphenol	625	10.0	< 5.0 ug/l	G or C	1/5 YR
51-28-5	2,4-Dinitrophenol	(4)	(5)	< 20.0 ug/l	G or C	1/5 YR
534-52-1	2-Methyl-4,6-Dinitrophenol	(4)	(5)	< 5.0 ug/l	G or C	1/5 YR
25154-52-3	Nonylphenol	(5)	(5)	< 5.0 ug/l	G or C	1/5 YR
87-86-5	Pentachlorophenol	625	50.0	< 10.0 ug/l	G or C	1/5 YR
108-95-2	Phenol	625	10.0	< 5.0 ug/l	G or C	1/5 YR
88-06-2	2,4,6-Trichlorophenol	625	10.0	< 5.0 ug/l	G or C	1/5 YR

CASRN#	CHEMICAL	EPA ANALYSIS NO.	QUANTIFICATION LEVEL <sup>(1)</sup>	REPORTING RESULTS	SAMPLE TYPE <sup>(2)</sup>	SAMPLE FREQUENCY
<b>MISCELLANEOUS</b>						
776-41-7	Ammonia as NH3-N	350.1	200	0.10 mg/l	C	1/5 YR
16887-00-6	Chlorides	(4)	(5)	67.9 mg/l	C	1/5 YR
7782-50-5	Chlorine, Total Residual	(4)	100	< 0.10 mg/l	G	1/5 YR
57-12-5	Cyanide, Free	(4)	10.0	< 5.0 ug/l	G	1/5 YR
N/A	<i>E. coli</i> / <i>Enterococcus</i> (N/CML)	(4)	(5)	22 N/CML	G	1/5 YR
7783-06-4	Hydrogen Sulfide	(5)	(5)	< 20.0 ug/l	G	1/5 YR
60-10-5	Tributyltin <sup>(7)</sup>	NBSR 85-3295	(5)	ND	G or C	1/5 YR
	Hardness (mg/L as CaCO <sub>3</sub> )	(4)	(5)	101 mg/l	G or C (10)	1/5 YR

Brian S. Thrower, City Manager

Name of Principal Exec. Officer or Authorized Agent/Title

 2/7/12  
Signature of Principal Officer or Authorized Agent/Date

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations. See 18 U.S.C. Sec. 1001 and 33 U.S.C. Sec. 1319. (Penalties under these statutes may include fines up to \$10,000 and or maximum imprisonment of between 6 months and 5 years.)

**FOOTNOTES:**

- (1) Quantification level (QL) is defined as the lowest concentration used for the calibration of a measurement system when the calibration is in accordance with the procedures published for the required method.

The quantification levels indicated for the metals are actually Specific Target Values developed for this permit. The Specific Target Value is the approximate value that may initiate a wasteload allocation analysis. Target values are not wasteload allocations or effluent limitations. The Specific Target Values are subject to change based on additional information such as hardness data, receiving stream flow, and design flows.

Units for the quantification level are micrograms/liter unless otherwise specified.

Quality control and quality assurance information shall be submitted to document that the required quantification level has been attained.

- (2) Sample Type

G = Grab = An individual sample collected in less than 15 minutes. Substances specified with "grab" sample type shall only be collected as grabs. The permittee may analyze multiple grabs and report

the average results provided that the individual grab results are also reported. For grab metals samples, the individual samples shall be filtered and preserved immediately upon collection.

C = Composite = A 24-hour (**PW - Revise as required to require same composite duration as BOD<sub>5</sub>**) composite unless otherwise specified. The composite shall be a combination of individual samples, taken proportional to flow, obtained at hourly or smaller time intervals. The individual samples may be of equal volume for flows that do not vary by +/- 10 percent over a 24-hour period.

- (3) A specific analytical method is not specified; however a target value for each metal has been established. An appropriate method to meet the target value shall be selected from the following list of EPA methods (or any approved method presented in 40 CFR Part 136). If the test result is less than the method QL, a "<[QL]" shall be reported where the actual analytical test QL is substituted for [QL].

<u>Metal</u>	<u>Analytical Method</u>
Antimony	1638; 1639
Arsenic	1632
Chromium <sup>(8)</sup>	1639
Cadmium	1637; 1638; 1639; 1640
Chromium VI	1639
Copper	1638; 1640
Lead	1637; 1638; 1640
Mercury	1631
Nickel	1638; 1639; 1640
Selenium	1638; 1639
Silver	1638
Zinc	1638; 1639

- (4) Any approved method presented in 40 CFR Part 136.
- (5) The QL is at the discretion of the permittee. For any substances addressed in 40 CFR Part 136, the permittee shall use one of the approved methods in 40 CFR Part 136.
- (6) Testing for phenols requires continuous extraction.
- (7) Analytical Methods: NBSR 85-3295 or DEQ's approved analysis for Tributyltin may also be used [See A Manual for the Analysis of Butyltins in Environmental Systems by the Virginia Institute of Marine Science, dated November 1996].
- (8) Both Chromium III and Chromium VI may be measured by the total chromium analysis. If the result of the total chromium analysis is less than or equal to the lesser of the Chromium III or Chromium VI method QL, the results for both Chromium III and Chromium VI can be reported as "<[QL]", where the actual analytical test QL is substituted for [QL].
- (9) The lab may use SW846 Method 8270D provided the lab has an Initial Demonstration of Capability, has passed a PT for Kepone, and meets the acceptance criteria for Kepone as given in Method 8270D
- (10) The sample type for Hardness (as CaCO<sub>3</sub>) shall match the sample type selected for Dissolved Metals.

Table 1. Flow DMR data

<b>Monthly Average (MGD)</b>	<b>Maximum (MGD)</b>	<b>DMR due date</b>
0.796	1.148	10-Jul-07
0.701	0.813	10-Aug-07
0.870	1.275	10-Sep-07
0.748	0.930	10-Oct-07
0.832	1.806	10-Nov-07
0.652	0.762	10-Dec-07
0.711	1.010	10-Jan-08
0.863	1.310	10-Feb-08
0.896	1.370	10-Mar-08
0.977	1.266	10-Apr-08
1.121	1.601	10-May-08
0.965	1.388	10-Jun-08
0.849	0.970	10-Jul-08
0.872	1.290	10-Aug-08
0.734	0.881	10-Sep-08
0.791	1.191	10-Oct-08
0.679	0.846	10-Nov-08
0.711	1.006	10-Dec-08
0.845	1.231	10-Jan-09
0.848	1.113	10-Feb-09
0.757	0.909	10-Mar-09
1.082	1.440	10-Apr-09
1.040	1.405	10-May-09
1.065	1.395	10-Jun-09
1.163	1.697	10-Jul-09
0.975	1.490	10-Aug-09
0.868	1.262	10-Sep-09
0.849	1.148	10-Oct-09
0.695	0.875	10-Nov-09
0.916	1.205	10-Dec-09
1.395	1.982	10-Jan-10
1.308	1.801	10-Feb-10
1.515	1.912	10-Mar-10
1.169	1.667	10-Apr-10
1.061	1.934	10-May-10
1.074	1.953	10-Jun-10
0.952	1.192	10-Jul-10
0.806	1.023	10-Aug-10
0.662	0.862	10-Sep-10
0.723	1.767	10-Oct-10
0.835	1.849	10-Nov-10
0.643	0.785	10-Dec-10
0.774	1.124	10-Jan-11
0.771	1.070	10-Feb-11
0.805	1.108	10-Mar-11
0.888	1.478	10-Apr-11
0.916	1.174	10-May-11
0.822	0.990	10-Jun-11
0.720	0.777	10-Jul-11
0.766	1.166	10-Aug-11

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Table 2. pH DMR data

Minimum (SU)	Maximum (SU)	DMR due date
6.71	7.80	10-Jul-07
7.15	7.58	10-Aug-07
7.25	7.70	10-Sep-07
7.32	7.72	10-Oct-07
7.20	7.71	10-Nov-07
7.38	7.92	10-Dec-07
7.00	7.87	10-Jan-08
6.88	7.61	10-Feb-08
6.87	7.60	10-Mar-08
6.72	7.44	10-Apr-08
7.00	7.56	10-May-08
6.91	7.77	10-Jun-08
7.05	7.76	10-Jul-08
6.98	7.84	10-Aug-08
7.15	7.75	10-Sep-08
7.00	7.58	10-Oct-08
7.16	7.56	10-Nov-08
7.08	7.55	10-Dec-08
6.42	7.44	10-Jan-09
6.77	7.43	10-Feb-09
7.15	7.61	10-Mar-09
6.97	7.46	10-Apr-09
6.97	7.36	10-May-09
7.00	7.48	10-Jun-09
6.69	7.44	10-Jul-09
6.89	7.60	10-Aug-09
7.11	7.64	10-Sep-09
7.20	7.69	10-Oct-09
7.15	7.63	10-Nov-09
7.05	7.72	10-Dec-09
6.51	7.46	10-Jan-10
6.62	7.28	10-Feb-10
6.57	7.30	10-Mar-10
6.85	7.56	10-Apr-10
6.75	7.44	10-May-10
6.78	7.48	10-Jun-10
7.15	7.61	10-Jul-10
6.89	7.64	10-Aug-10
7.15	7.72	10-Sep-10
6.99	7.54	10-Oct-10
6.85	7.74	10-Nov-10
7.08	7.63	10-Dec-10
6.93	7.65	10-Jan-11
7.03	7.45	10-Feb-11
7.02	7.27	10-Mar-11
6.82	7.33	10-Apr-11
6.68	7.30	10-May-11
7.08	7.80	10-Jun-11
7.25	7.77	10-Jul-11
7.17	7.66	10-Aug-11
	90 <sup>th</sup> percentile max: 7.77	10 <sup>th</sup> percentile max: 7.36

Table 3. BOD<sub>5</sub> DMR data

Monthly Average (mg/L)	Monthly Average (kg/d)	Weekly Average (mg/L)	Monthly Average (kg/d)	DMR due date
7.72	22.75	10.60	30.09	10-Jul-07
8.09	20.79	8.59	23.97	10-Aug-07
4.84	16.21	7.83	28.66	10-Sep-07
4.79	13.22	6.68	18.36	10-Oct-07
1.36	4.29	2.48	8.23	10-Nov-07
2.53	6.06	2.20	5.13	10-Dec-07
2.79	7.08	4.94	13.02	10-Jan-08
>25.99	>84.78	>38.78	>122.08	10-Feb-08
5	16	9	32	10-Mar-08
5	22	18	78	10-Apr-08
2.5	10	5.0	19	10-May-08
1.2	6	5.2	24	10-Jun-08
0.4	2	1.9	7	10-Jul-08
<QL	<QL	<QL	<QL	10-Aug-08
0.9	3	2.2	7	10-Sep-08
0.5	1	<QL	<QL	10-Oct-08
1.1	3	2.6	7	10-Nov-08
<QL	<QL	<QL	<QL	10-Dec-08
0.8	2	1.8	8	10-Jan-09
1.0	3	2.1	5	10-Feb-09
1.1	3	3.8	11	10-Mar-09
5.4	20	7.5	32	10-Apr-09
4.0	16	8.1	29	10-May-09
1.6	7	2.6	11	10-Jun-09
1.6	6	<QL	<QL	10-Jul-09
3.1	11	2.1	7	10-Aug-09
1.8	5	5.3	16	10-Sep-09
0.7	2	3.4	10	10-Oct-09
<QL	<QL	<QL	<QL	10-Nov-09
<QL	<QL	<QL	<QL	10-Dec-09
2.8	15	4.8	28	10-Jan-10
<QL	<QL	<QL	<QL	10-Feb-10
8.7	55	30.2	196	10-Mar-10
4.0	19	3.5	15	10-Apr-10
0.7	5	<QL	<QL	10-May-10
<QL	<QL	<QL	<QL	10-Jun-10
0.4	1	1.9	6	10-Jul-10
0.5	2	2.3	8	10-Aug-10
<QL	<QL	<QL	<QL	10-Sep-10
0.8	2	2.0	5	10-Oct-10
2.7	9.0	6.3	24	10-Nov-10
0.9	2.3	1.9	4.4	10-Dec-10
4.1	13.0	<QL	<QL	10-Jan-11
1.1	3.2	2.6	7.6	10-Feb-11
<QL	<QL	<QL	<QL	10-Mar-11
1.4	4.0	3.7	10	10-Apr-11
2.4	8.8	9.6	35	10-May-11
<QL	<QL	<QL	<QL	10-Jun-11

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<QL	<QL	<QL	<QL	10-Jul-11
0.5	1.1	1.8	4.5	10-Aug-11

Table 4. TSS DMR data

Monthly Average (mg/L)	Monthly Average (kg/d)	Weekly Average (mg/L)	Monthly Average (kg/d)	DMR due date
15.04	42.49	9.89	28.48	10-Jul-07
7.42	17.99	7.42	17.99	10-Aug-07
5.60	15.43	5.60	15.43	10-Sep-07
5.35	12.43	5.35	12.43	10-Oct-07
4.50	14.07	3.20	10.36	10-Nov-07
4.80	9.41	4.80	9.41	10-Dec-07
11.50	29.73	11.50	29.73	10-Jan-08
5.75	18.28	5.75	18.28	10-Feb-08
9	33	9	33	10-Mar-08
2.2	6.2	2.2	6.2	10-Apr-08
7.4	42	7.4	42	10-May-08
2.9	10	2.9	10	10-Jun-08
6.4	22	6.4	22	10-Jul-08
5.1	22	5.1	22	10-Aug-08
4.0	12	4.0	12	10-Sep-08
8.1	24	8.1	24	10-Oct-08
14.1	36	14.1	36	10-Nov-08
3.9	9	3.9	9	10-Dec-08
26	74	26	74	10-Jan-09
16	34	16	34	10-Feb-09
2.8	8	2.8	8	10-Mar-09
12.8	52	12.8	52	10-Apr-09
11.0	44	11.0	44	10-May-09
10	43	10	43	10-Jun-09
14	79	14	79	10-Jul-09
14	46	14	46	10-Aug-09
13	45	13	45	10-Sep-09
5.9	19	5.9	19	10-Oct-09
8.8	24	8.8	24	10-Nov-09
10	30	10	30	10-Dec-09
6.7	27	6.7	27	10-Jan-10
6.4	27	6.4	27	10-Feb-10
4.5	23	4.5	23	10-Mar-10
11	42	11	42	10-Apr-10
6.8	25	6.8	25	10-May-10
5.2	17	5.2	17	10-Jun-10
4.6	18	4.6	18	10-Jul-10
4.2	13	4.2	13	10-Aug-10
5.5	14	5.5	14	10-Sep-10
11	27	11	27	10-Oct-10
9.4	27	9.4	27	10-Nov-10
9.0	25	9.0	25	10-Dec-10
9.6	22	9.6	22	10-Jan-11
4.4	14	4.4	14	10-Feb-11
8.8	29	8.8	29	10-Mar-11

Monthly Average (mg/L)	Monthly Average (kg/d)	Weekly Average (mg/L)	Monthly Average (kg/d)	DMR due date
8.6	36	8.5	31	10-Apr-11
11	31	11	31	10-May-11
7.2	22	7.2	22	10-Jun-11
8.0	22	8.0	22	10-Jul-11
2.9	9	2.9	9	10-Aug-11

Table 5. Dissolved Oxygen and *E. coli* DMR data

DO minimum (mg/L)	<i>E. coli</i> count (N/100mL)	DMR due date
7.0	200	10-Jul-07
6.6	117	10-Aug-07
6.8	46	10-Sep-07
6.7	49	10-Oct-07
7.0	65	10-Nov-07
8.0	26	10-Dec-07
8.8	24	10-Jan-08
9.4	489	10-Feb-08
8.4	49	10-Mar-08
8.6	17	10-Apr-08
8.4	71	10-May-08
7.6	62	10-Jun-08
6.9	75	10-Jul-08
6.8	18	10-Aug-08
6.8	34	10-Sep-08
6.8	31	10-Oct-08
7.6	21	10-Nov-08
8.2	42	10-Dec-08
7.5	51	10-Jan-09
8.2	16	10-Feb-09
9.5	16	10-Mar-09
6.8	22	10-Apr-09
8.1	36	10-May-09
7.6	54	10-Jun-09
7.2	36	10-Jul-09
6.9	33	10-Aug-09
6.8	30	10-Sep-09
6.4	24	10-Oct-09
7.7	30	10-Nov-09
6.8	37	10-Dec-09
8.9	33	10-Jan-10
9.4	27	10-Feb-10
9.8	63	10-Mar-10
9.2	92	10-Apr-10
8.0	38	10-May-10
7.8	39	10-Jun-10
7.0	61	10-Jul-10
6.6	61	10-Aug-10
6.8	92	10-Sep-10
6.8	148	10-Oct-10
6.8	34	10-Nov-10

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<b>DO minimum (mg/L)</b>	<b><i>E. coli</i> count (N/100mL)</b>	<b>DMR due date</b>
8.1	17	10-Dec-10
8.9	43	10-Jan-11
9.6	4	10-Feb-11
8.4	26	10-Mar-11
9.0	34	10-Apr-11
6.2	36	10-May-11
6.2	57	10-Jun-11
7.0	29	10-Jul-11
7.0	52	10-Aug-11

**Attachment G: Mix.exe, MSTRANTI data source report,  
MSTRANTI**

Mixing Zone Predictions for

Emporia WWTP

Effluent Flow = 1.5 MGD  
Stream 7Q10 = 12 MGD  
Stream 30Q10 = 18 MGD  
Stream 1Q10 = 4.9 MGD  
Stream slope = .00054 ft/ft  
Stream width = 34 ft  
Bottom scale = 2  
Channel scale = 1

-----  
Mixing Zone Predictions @ 7Q10

Depth = 1.2703 ft  
Length = 1185.07 ft  
Velocity = .4838 ft/sec  
Residence Time = .0283 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

-----  
Mixing Zone Predictions @ 30Q10

Depth = 1.5951 ft  
Length = 968.84 ft  
Velocity = .5566 ft/sec  
Residence Time = .0201 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

-----  
Mixing Zone Predictions @ 1Q10

Depth = .8034 ft  
Length = 1766.23 ft  
Velocity = .3627 ft/sec  
Residence Time = 1.3527 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 73.93% of the 1Q10 is used.

## MSTRANTI DATA SOURCE REPORT

Stream information	
Mean Hardness	Ambient Stream Station 5AMHN052.34
90% Temperature (annual)	
90% Maximum pH	
10% Maximum pH	
Tier Designation	Tier Determination (Tier 1)
Stream Flows	
All Data	Flow Frequency Determination (Attachment A)
Mixing Information	
All Data	Mix.exe
Effluent Information	
Mean Hardness	Permit application (Attachment A)
90 <sup>th</sup> percentile Temperature (annual)	Calculated from 2009-2011 effluent data (27°C)
90% Maximum pH	Calculated from DMR data
10% Maximum pH	Calculated from DMR data
Discharge flow	Design Flow (1.5 MGD)

Data Location:

Flow Frequency Memo (Stream Information) – Attachment A  
DMR and effluent data- Attachment F

# FRESHWATER WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Emporia WWTP

Permit No.: VA0020346

Receiving Stream: Meherrin River

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information		Effluent Information	
Mean Hardness (as CaCO3) =	26 mg/L	1Q10 (Annual) =	4.9 MGD	Annual - 1Q10 Mix =	73.93 %	Mean Hardness (as CaCO3) =	101 mg/L
90% Temperature (Annual) =	26.1 deg C	7Q10 (Annual) =	12 MGD	- 7Q10 Mix =	100 %	90% Temp (Annual) =	27 deg C
90% Temperature (Wet season) =	deg C	30Q10 (Annual) =	18 MGD	- 30Q10 Mix =	100 %	90% Temp (Wet season) =	deg C
90% Maximum pH =	7.5 SU	1Q10 (Wet season) =	64 MGD	Wet Season - 1Q10 Mix =	%	90% Maximum pH =	7.77 SU
10% Maximum pH =	6.4 SU	30Q10 (Wet season) =	164 MGD	- 30Q10 Mix =	%	10% Maximum pH =	7.36 SU
Tier Designation (1 or 2) =	1	30Q5 =	26 MGD			Discharge Flow =	1.5 MGD
Public Water Supply (PWS) Y/N? =	n	Harmonic Mean =	93.1 MGD				
Trout Present Y/N? =	n						
Early Life Stages Present Y/N? =	y						

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	5	--	--	na	9.9E+02	--	--	na	1.8E+04	--	--	--	--	--	--	--	--	--	--	na	1.8E+04
Acrolein	0	--	--	na	9.3E+00	--	--	na	1.7E+02	--	--	--	--	--	--	--	--	--	--	na	1.7E+02
Acrylonitrile <sup>C</sup>	0	--	--	na	2.5E+00	--	--	na	1.6E+02	--	--	--	--	--	--	--	--	--	--	na	1.6E+02
Aldrin <sup>C</sup>	0	3.0E+00	--	na	5.0E-04	1.0E+01	--	na	3.2E-02	--	--	--	--	--	--	--	--	1.0E+01	--	na	3.2E-02
Ammonia-N (mg/l) (Yearly)	0	1.81E+01	2.03E+00	na	--	6.17E+01	2.64E+01	na	--	--	--	--	--	--	--	--	--	6.17E+01	2.64E+01	na	--
Ammonia-N (mg/l) (High Flow)	0	1.28E+01	3.30E+00	na	--	1.28E+01	3.30E+00	na	--	--	--	--	--	--	--	--	--	1.28E+01	3.30E+00	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	7.3E+05	--	--	--	--	--	--	--	--	--	--	na	7.3E+05
Antimony	0	--	--	na	6.4E+02	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
Arsenic	0	3.4E+02	1.5E+02	na	--	1.2E+03	1.4E+03	na	--	--	--	--	--	--	--	--	--	1.2E+03	1.4E+03	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene <sup>C</sup>	0	--	--	na	5.1E+02	--	--	na	3.2E+04	--	--	--	--	--	--	--	--	--	--	na	3.2E+04
Benzidine <sup>C</sup>	0	--	--	na	2.0E-03	--	--	na	1.3E-01	--	--	--	--	--	--	--	--	--	--	na	1.3E-01
Benzo (a) anthracene <sup>C</sup>	0	--	--	na	1.8E-01	--	--	na	1.1E+01	--	--	--	--	--	--	--	--	--	--	na	1.1E+01
Benzo (b) fluoranthene <sup>C</sup>	0	--	--	na	1.8E-01	--	--	na	1.1E+01	--	--	--	--	--	--	--	--	--	--	na	1.1E+01
Benzo (k) fluoranthene <sup>C</sup>	0	--	--	na	1.8E-01	--	--	na	1.1E+01	--	--	--	--	--	--	--	--	--	--	na	1.1E+01
Benzo (a) pyrene <sup>C</sup>	0	--	--	na	1.8E-01	--	--	na	1.1E+01	--	--	--	--	--	--	--	--	--	--	na	1.1E+01
Bis2-Chloroethyl Ether <sup>C</sup>	0	--	--	na	5.3E+00	--	--	na	3.3E+02	--	--	--	--	--	--	--	--	--	--	na	3.3E+02
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	1.2E+06	--	--	--	--	--	--	--	--	--	--	na	1.2E+06
Bis 2-Ethylhexyl Phthalate <sup>C</sup>	0	--	--	na	2.2E+01	--	--	na	1.4E+03	--	--	--	--	--	--	--	--	--	--	na	1.4E+03
Bromoform <sup>C</sup>	0	--	--	na	1.4E+03	--	--	na	8.8E+04	--	--	--	--	--	--	--	--	--	--	na	8.8E+04
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	3.5E+04	--	--	--	--	--	--	--	--	--	--	na	3.5E+04
Cadmium	0	1.7E+00	4.9E-01	na	--	5.8E+00	4.4E+00	na	--	--	--	--	--	--	--	--	--	5.8E+00	4.4E+00	na	--
Carbon Tetrachloride <sup>C</sup>	0	--	--	na	1.6E+01	--	--	na	1.0E+03	--	--	--	--	--	--	--	--	--	--	na	1.0E+03
Chlordane <sup>C</sup>	0	2.4E+00	4.3E-03	na	8.1E-03	8.2E+00	3.9E-02	na	5.1E-01	--	--	--	--	--	--	--	--	8.2E+00	3.9E-02	na	5.1E-01
Chloride	0	8.6E+05	2.3E+05	na	--	2.9E+06	2.1E+06	na	--	--	--	--	--	--	--	--	--	2.9E+06	2.1E+06	na	--
TRC	0	1.9E+01	1.1E+01	na	--	6.5E+01	9.9E+01	na	--	--	--	--	--	--	--	--	--	6.5E+01	9.9E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	2.9E+04	--	--	--	--	--	--	--	--	--	--	na	2.9E+04

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane <sup>C</sup>	0	--	--	na	1.3E+02	--	--	na	8.2E+03	--	--	--	--	--	--	--	--	--	--	na	8.2E+03
Chloroform	0	--	--	na	1.1E+04	--	--	na	2.0E+05	--	--	--	--	--	--	--	--	--	--	na	2.0E+05
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	2.9E+04	--	--	--	--	--	--	--	--	--	--	na	2.9E+04
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	2.8E+03	--	--	--	--	--	--	--	--	--	--	na	2.8E+03
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	2.8E-01	3.7E-01	na	--	--	--	--	--	--	--	--	--	2.8E-01	3.7E-01	na	--
Chromium III	0	3.1E+02	3.1E+01	na	--	1.1E+03	2.8E+02	na	--	--	--	--	--	--	--	--	--	1.1E+03	2.8E+02	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	5.5E+01	9.9E+01	na	--	--	--	--	--	--	--	--	--	5.5E+01	9.9E+01	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene <sup>C</sup>	0	--	--	na	1.8E-02	--	--	na	1.1E+00	--	--	--	--	--	--	--	--	--	--	na	1.1E+00
Copper	0	6.7E+00	3.6E+00	na	--	2.3E+01	3.2E+01	na	--	--	--	--	--	--	--	--	--	2.3E+01	3.2E+01	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	7.5E+01	4.7E+01	na	2.9E+05	--	--	--	--	--	--	--	--	7.5E+01	4.7E+01	na	2.9E+05
DDD <sup>C</sup>	0	--	--	na	3.1E-03	--	--	na	2.0E-01	--	--	--	--	--	--	--	--	--	--	na	2.0E-01
DDE <sup>C</sup>	0	--	--	na	2.2E-03	--	--	na	1.4E-01	--	--	--	--	--	--	--	--	--	--	na	1.4E-01
DDT <sup>C</sup>	0	1.1E+00	1.0E-03	na	2.2E-03	3.8E+00	9.0E-03	na	1.4E-01	--	--	--	--	--	--	--	--	3.8E+00	9.0E-03	na	1.4E-01
Demeton	0	--	1.0E-01	na	--	--	9.0E-01	na	--	--	--	--	--	--	--	--	--	--	9.0E-01	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	5.8E-01	1.5E+00	na	--	--	--	--	--	--	--	--	--	5.8E-01	1.5E+00	na	--
Dibenz(a,h)anthracene <sup>C</sup>	0	--	--	na	1.8E-01	--	--	na	1.1E+01	--	--	--	--	--	--	--	--	--	--	na	1.1E+01
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	2.4E+04	--	--	--	--	--	--	--	--	--	--	na	2.4E+04
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	1.8E+04	--	--	--	--	--	--	--	--	--	--	na	1.8E+04
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	3.5E+03	--	--	--	--	--	--	--	--	--	--	na	3.5E+03
3,3-Dichlorobenzidine <sup>C</sup>	0	--	--	na	2.8E-01	--	--	na	1.8E+01	--	--	--	--	--	--	--	--	--	--	na	1.8E+01
Dichlorobromomethane <sup>C</sup>	0	--	--	na	1.7E+02	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
1,2-Dichloroethane <sup>C</sup>	0	--	--	na	3.7E+02	--	--	na	2.3E+04	--	--	--	--	--	--	--	--	--	--	na	2.3E+04
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	1.3E+05	--	--	--	--	--	--	--	--	--	--	na	1.3E+05
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	1.8E+05	--	--	--	--	--	--	--	--	--	--	na	1.8E+05
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	5.3E+03	--	--	--	--	--	--	--	--	--	--	na	5.3E+03
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane <sup>C</sup>	0	--	--	na	1.5E+02	--	--	na	9.5E+03	--	--	--	--	--	--	--	--	--	--	na	9.5E+03
1,3-Dichloropropene <sup>C</sup>	0	--	--	na	2.1E+02	--	--	na	1.3E+04	--	--	--	--	--	--	--	--	--	--	na	1.3E+04
Dieldrin <sup>C</sup>	0	2.4E-01	5.6E-02	na	5.4E-04	8.2E-01	5.0E-01	na	3.4E-02	--	--	--	--	--	--	--	--	8.2E-01	5.0E-01	na	3.4E-02
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	8.1E+05	--	--	--	--	--	--	--	--	--	--	na	8.1E+05
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	1.6E+04	--	--	--	--	--	--	--	--	--	--	na	1.6E+04
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	2.0E+07	--	--	--	--	--	--	--	--	--	--	na	2.0E+07
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	8.3E+04	--	--	--	--	--	--	--	--	--	--	na	8.3E+04
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	9.7E+04	--	--	--	--	--	--	--	--	--	--	na	9.7E+04
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	5.1E+03	--	--	--	--	--	--	--	--	--	--	na	5.1E+03
2,4-Dinitrotoluene <sup>C</sup>	0	--	--	na	3.4E+01	--	--	na	2.1E+03	--	--	--	--	--	--	--	--	--	--	na	2.1E+03
Dioxin 2,3,7,8- tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	9.4E-07	--	--	--	--	--	--	--	--	--	--	na	9.4E-07
1,2-Diphenylhydrazine <sup>C</sup>	0	--	--	na	2.0E+00	--	--	na	1.3E+02	--	--	--	--	--	--	--	--	--	--	na	1.3E+02
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	7.5E-01	5.0E-01	na	1.6E+03	--	--	--	--	--	--	--	--	7.5E-01	5.0E-01	na	1.6E+03
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	7.5E-01	5.0E-01	na	1.6E+03	--	--	--	--	--	--	--	--	7.5E-01	5.0E-01	na	1.6E+03
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	7.5E-01	5.0E-01	--	--	--	--	--	--	--	--	--	--	7.5E-01	5.0E-01	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	1.6E+03	--	--	--	--	--	--	--	--	--	--	na	1.6E+03
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	2.9E-01	3.2E-01	na	1.1E+00	--	--	--	--	--	--	--	--	2.9E-01	3.2E-01	na	1.1E+00
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	5.5E+00	--	--	--	--	--	--	--	--	--	--	na	5.5E+00

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	3.9E+04	--	--	--	--	--	--	--	--	--	--	na	3.9E+04
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	2.6E+03	--	--	--	--	--	--	--	--	--	--	na	2.6E+03
Fluorene	0	--	--	na	5.3E+03	--	--	na	9.7E+04	--	--	--	--	--	--	--	--	--	--	na	9.7E+04
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	9.0E-02	na	--	--	--	--	--	--	--	--	--	--	9.0E-02	na	--
Heptachlor <sup>C</sup>	0	5.2E-01	3.8E-03	na	7.9E-04	1.8E+00	3.4E-02	na	5.0E-02	--	--	--	--	--	--	--	--	1.8E+00	3.4E-02	na	5.0E-02
Heptachlor Epoxide <sup>C</sup>	0	5.2E-01	3.8E-03	na	3.9E-04	1.8E+00	3.4E-02	na	2.5E-02	--	--	--	--	--	--	--	--	1.8E+00	3.4E-02	na	2.5E-02
Hexachlorobenzene <sup>C</sup>	0	--	--	na	2.9E-03	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Hexachlorobutadiene <sup>C</sup>	0	--	--	na	1.8E+02	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
Hexachlorocyclohexane																					
Alpha-BHC <sup>C</sup>	0	--	--	na	4.9E-02	--	--	na	3.1E+00	--	--	--	--	--	--	--	--	--	--	na	3.1E+00
Hexachlorocyclohexane																					
Beta-BHC <sup>C</sup>	0	--	--	na	1.7E-01	--	--	na	1.1E+01	--	--	--	--	--	--	--	--	--	--	na	1.1E+01
Hexachlorocyclohexane																					
Gamma-BHC <sup>C</sup> (Lindane)	0	9.5E-01	na	na	1.8E+00	3.2E+00	--	na	1.1E+02	--	--	--	--	--	--	--	--	3.2E+00	--	na	1.1E+02
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	2.0E+04	--	--	--	--	--	--	--	--	--	--	na	2.0E+04
Hexachloroethane <sup>C</sup>	0	--	--	na	3.3E+01	--	--	na	2.1E+03	--	--	--	--	--	--	--	--	--	--	na	2.1E+03
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	1.8E+01	na	--	--	--	--	--	--	--	--	--	--	1.8E+01	na	--
Indeno (1,2,3-cd) pyrene <sup>C</sup>	0	--	--	na	1.8E-01	--	--	na	1.1E+01	--	--	--	--	--	--	--	--	--	--	na	1.1E+01
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone <sup>C</sup>	0	--	--	na	9.6E+03	--	--	na	6.1E+05	--	--	--	--	--	--	--	--	--	--	na	6.1E+05
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Lead	0	4.7E+01	3.5E+00	na	--	1.6E+02	3.1E+01	na	--	--	--	--	--	--	--	--	--	1.6E+02	3.1E+01	na	--
Malathion	0	--	1.0E-01	na	--	--	9.0E-01	na	--	--	--	--	--	--	--	--	--	--	9.0E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	4.8E+00	6.9E+00	--	--	--	--	--	--	--	--	--	--	4.8E+00	6.9E+00	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	2.8E+04	--	--	--	--	--	--	--	--	--	--	na	2.8E+04
Methylene Chloride <sup>C</sup>	0	--	--	na	5.9E+03	--	--	na	3.7E+05	--	--	--	--	--	--	--	--	--	--	na	3.7E+05
Methoxychlor	0	--	3.0E-02	na	--	--	2.7E-01	na	--	--	--	--	--	--	--	--	--	--	2.7E-01	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Nickel	0	9.8E+01	8.2E+00	na	4.6E+03	3.3E+02	7.4E+01	na	8.4E+04	--	--	--	--	--	--	--	--	3.3E+02	7.4E+01	na	8.4E+04
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	1.3E+04	--	--	--	--	--	--	--	--	--	--	na	1.3E+04
N-Nitrosodimethylamine <sup>C</sup>	0	--	--	na	3.0E+01	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	--	--	na	1.9E+03
N-Nitrosodiphenylamine <sup>C</sup>	0	--	--	na	6.0E+01	--	--	na	3.8E+03	--	--	--	--	--	--	--	--	--	--	na	3.8E+03
N-Nitrosodi-n-propylamine <sup>C</sup>	0	--	--	na	5.1E+00	--	--	na	3.2E+02	--	--	--	--	--	--	--	--	--	--	na	3.2E+02
Nonylphenol	0	2.8E+01	6.6E+00	--	--	9.6E+01	5.9E+01	na	--	--	--	--	--	--	--	--	--	9.6E+01	5.9E+01	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	2.2E-01	1.2E-01	na	--	--	--	--	--	--	--	--	--	2.2E-01	1.2E-01	na	--
PCB Total <sup>C</sup>	0	--	1.4E-02	na	6.4E-04	--	1.3E-01	na	4.0E-02	--	--	--	--	--	--	--	--	--	1.3E-01	na	4.0E-02
Pentachlorophenol <sup>C</sup>	0	5.4E+00	3.8E+00	na	3.0E+01	1.9E+01	3.4E+01	na	1.9E+03	--	--	--	--	--	--	--	--	1.9E+01	3.4E+01	na	1.9E+03
Phenol	0	--	--	na	8.6E+05	--	--	na	1.6E+07	--	--	--	--	--	--	--	--	--	--	na	1.6E+07
Pyrene	0	--	--	na	4.0E+03	--	--	na	7.3E+04	--	--	--	--	--	--	--	--	--	--	na	7.3E+04
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	7.3E+01	--	--	--	--	--	--	--	--	--	--	na	7.3E+01
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	6.8E+01	4.5E+01	na	7.7E+04	--	--	--	--	--	--	--	--	6.8E+01	4.5E+01	na	7.7E+04
Silver	0	9.7E-01	--	na	--	3.3E+00	--	na	--	--	--	--	--	--	--	--	--	3.3E+00	--	na	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,1,2,2-Tetrachloroethane <sup>C</sup>	0	--	--	na	4.0E+01	--	--	na	2.5E+03	--	--	--	--	--	--	--	--	--	--	na	2.5E+03
Tetrachloroethylene <sup>C</sup>	0	--	--	na	3.3E+01	--	--	na	2.1E+03	--	--	--	--	--	--	--	--	--	--	na	2.1E+03
Thallium	0	--	--	na	4.7E-01	--	--	na	8.6E+00	--	--	--	--	--	--	--	--	--	--	na	8.6E+00
Toluene	0	--	--	na	6.0E+03	--	--	na	1.1E+05	--	--	--	--	--	--	--	--	--	--	na	1.1E+05
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Toxaphene <sup>C</sup>	0	7.3E-01	2.0E-04	na	2.8E-03	2.5E+00	1.8E-03	na	1.8E-01	--	--	--	--	--	--	--	--	2.5E+00	1.8E-03	na	1.8E-01
Tributyltin	0	4.6E-01	7.2E-02	na	--	1.6E+00	6.5E-01	na	--	--	--	--	--	--	--	--	--	1.6E+00	6.5E-01	na	--
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	1.3E+03	--	--	--	--	--	--	--	--	--	--	na	1.3E+03
1,1,2-Trichloroethane <sup>C</sup>	0	--	--	na	1.6E+02	--	--	na	1.0E+04	--	--	--	--	--	--	--	--	--	--	na	1.0E+04
Trichloroethylene <sup>C</sup>	0	--	--	na	3.0E+02	--	--	na	1.9E+04	--	--	--	--	--	--	--	--	--	--	na	1.9E+04
2,4,6-Trichlorophenol <sup>C</sup>	0	--	--	na	2.4E+01	--	--	na	1.5E+03	--	--	--	--	--	--	--	--	--	--	na	1.5E+03
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Vinyl Chloride <sup>C</sup>	0	--	--	na	2.4E+01	--	--	na	1.5E+03	--	--	--	--	--	--	--	--	--	--	na	1.5E+03
Zinc	0	6.3E+01	4.8E+01	na	2.6E+04	2.1E+02	4.3E+02	na	4.8E+05	--	--	--	--	--	--	--	--	2.1E+02	4.3E+02	na	4.8E+05

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.  
Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic  
= (0.1(WQC - background conc.) + background conc.) for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	1.2E+04
Arsenic	4.6E+02
Barium	na
Cadmium	2.3E+00
Chromium III	1.7E+02
Chromium VI	2.2E+01
Copper	9.2E+00
Iron	na
Lead	1.9E+01
Manganese	na
Mercury	1.9E+00
Nickel	4.4E+01
Selenium	2.7E+01
Silver	1.3E+00
Zinc	8.6E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

## **Attachment H: Stats.exe Results**

Stats.exe results for VA0020346- Emporia WWTP

Facility = Emporia WWTP  
Chemical = Dissolved Cadmium  
Chronic averaging period = 4  
WLAa = 5.8  
WLAc = 4.4  
Q.L. = .3  
# samples/mo. = 1  
# samples/wk. = 1

Summary of Statistics:

# observations = 1  
Expected Value = .33  
Variance = .039204  
C.V. = 0.6  
97th percentile daily values = .803027  
97th percentile 4 day average = .549050  
97th percentile 30 day average = .397997  
# < Q.L. = 0  
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

0.33 µg/L

Facility = Emporia WWTP  
Chemical = Dissolved Copper  
Chronic averaging period = 4  
WLAa = 23  
WLAc = 32  
Q.L. = .5  
# samples/mo. = 1  
# samples/wk. = 1

Summary of Statistics:

# observations = 1  
Expected Value = 5.6  
Variance = 11.2896  
C.V. = 0.6  
97th percentile daily values = 13.6271  
97th percentile 4 day average = 9.31722  
97th percentile 30 day average = 6.75389  
# < Q.L. = 0  
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

5.6 µg/L

Facility = Emporia WWTP  
Chemical = Dissolved Lead  
Chronic averaging period = 4  
WLAa = 160  
WLAc = 31  
Q.L. = .5  
# samples/mo. = 1  
# samples/wk. = 1

Summary of Statistics:

# observations = 1  
Expected Value = .5  
Variance = .09  
C.V. = 0.6  
97th percentile daily values = 1.21670  
97th percentile 4 day average = .831895  
97th percentile 30 day average = .603026  
# < Q.L. = 0  
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

0.5 µg/L

Facility = Emporia WWTP  
Chemical = Dissolved Nickel  
Chronic averaging period = 4  
WLAa = 330  
WLAc = 74  
Q.L. = .94  
# samples/mo. = 1  
# samples/wk. = 1

Summary of Statistics:

# observations = 1  
Expected Value = 2.3  
Variance = 1.9044  
C.V. = 0.6  
97th percentile daily values = 5.59686  
97th percentile 4 day average = 3.82671  
97th percentile 30 day average = 2.77392  
# < Q.L. = 0  
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

2.3 µg/L

Facility = Emporia WWTP  
Chemical = Total recoverable selenium  
Chronic averaging period = 4  
WLAa = 68  
WLAc = 45  
Q.L. = 2.0  
# samples/mo. = 1  
# samples/wk. = 1

Summary of Statistics:

# observations = 1  
Expected Value = 5  
Variance = 9  
C.V. = 0.6  
97th percentile daily values = 12.1670  
97th percentile 4 day average = 8.31895  
97th percentile 30 day average = 6.03026  
# < Q.L. = 0  
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

5.0 µg/L

Although total recoverable selenium was reported on the application as <5.0 µg/L, the lab QL of 5.0 µg/L is greater than the Agency QL of 2.0 µg/L. For this reason, total recoverable selenium was treated as present at the lab QL of 5.0 µg/L for the purpose of this evaluation. No limit is needed.

Facility = Emporia WWTP  
Chemical = Dissolved Zinc  
Chronic averaging period = 4  
WLAa = 210  
WLAc = 430  
Q.L. = 3.6  
# samples/mo. = 1  
# samples/wk. = 1

Summary of Statistics:

# observations = 1  
Expected Value = 47  
Variance = 795.24  
C.V. = 0.6  
97th percentile daily values = 114.370  
97th percentile 4 day average = 78.1981  
97th percentile 30 day average = 56.6845  
# < Q.L. = 0  
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

47 µg/L

Facility = Emporia WWTP  
Chemical = Ammonia-N  
Chronic averaging period = 30  
WLAa = 61.7  
WLAc = 26.4  
Q.L. = .2  
# samples/mo. = 1  
# samples/wk. = 1

Summary of Statistics:

# observations = 1  
Expected Value = 9  
Variance = 29.16  
C.V. = 0.6  
97th percentile daily values = 21.9007  
97th percentile 4 day average = 14.9741  
97th percentile 30 day average = 10.8544  
# < Q.L. = 0  
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

9.0 mg/L

Although ammonia-N was reported on the permit application as less than the QL, ammonia-N is a known component of domestic wastewater, with the expected concentration of 9.0 mg/L. In accordance with GM00-2011, a datum of 9.0 mg/L is used to perform a reasonable potential analysis on this parameter. No limit is needed.

Facility = Emporia WWTP  
Chemical = Dissolved silver  
Chronic averaging period = 4  
WLAa = 3.3  
WLAc =  
Q.L. = .2  
# samples/mo. = 1  
# samples/wk. = 1

Summary of Statistics:

# observations = 1  
Expected Value = .5  
Variance = .09  
C.V. = 0.6  
97th percentile daily values = 1.21670  
97th percentile 4 day average = .831895  
97th percentile 30 day average = .603026  
# < Q.L. = 0  
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

0.5 µg/L

Although dissolved silver was reported on the application as <0.5 µg/L, the lab QL of 0.5 µg/L is greater than the Agency QL of 0.20 µg/L. For this reason, dissolved silver was treated as present at the lab QL of 0.50 µg/L for the purpose of this evaluation. No limit is needed.

Facility = Emporia WWTP  
Chemical = Chlorides  
Chronic averaging period = 4  
WLAa = 2900000  
WLAc = 2100000  
Q.L. = 1  
# samples/mo. = 1  
# samples/wk. = 1

Summary of Statistics:

# observations = 1  
Expected Value = 67900  
Variance = 1659747  
C.V. = 0.6  
97th percentile daily values = 165229.  
97th percentile 4 day average = 112971.  
97th percentile 30 day average= 81891.0  
# < Q.L. = 0  
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

67900 µg/L

## **Attachment I: Stream Sanitation Memorandum (8/9/1988)**

# MEMORANDUM

## State Water Control Board

2111 North Hamilton Street

P. O. Box 11143

Richmond, VA. 23230

**SUBJECT:** The Proposed Effluent Limits for Emporia STP,  
Greensville County, Meherrin River, Chowan River Basin

**TO:** Martin Ferguson via Tom Modena *JDM ok 8-12-88*

**FROM:** D. X. Ren, PRO *(9x)*

**DATE:** August 9, 1988

**COPIES:** George Whitaker, File

On July 28, 1988, Emporia STP submitted a request of stream analysis for a new discharge flow ( $Q = 1.5$  MGD).

After reviewing the existing models, this discharge was included in the modeling efforts of Greensville County STP in August 1985.

Based on the existing data in the above described file, a steam analysis was performed using a PC version to simulate CBOD, NBOD, and DO. TKN was of special concern in its effluent limits because of the nature of the discharge and the existence of other industrial discharges upstream. This modeling version duplicates the previous result, using a programmable calculator (Monroe).

This facility was addressed in the 303(e) plan. To be consistent with the previous model, antidegradation policy was not applied for this case, as in the Greensville County model.

The modeling parameters used for this case are indicated on the attached table.

From the results, the following effluent limits are proposed for the Emporia STP:

$Q = 1.50$  MGD  
 $BOD_5 = 30.0$  mg/l  
 $DO = 5.0$  mg/l  
Temp =  $28^{\circ}C$

The input to the model for BOD was  $CBOD_5 = 25.0$  mg/l, ( $CBOD_u / CBOD_5 = 2.5$ ). This was converted to  $BOD_5 = 30.0$  mg/l for the discharge limits. NBOD calculation was based on the previous formula,  $NBOD_u = 4.33 * TKN$ . Because the model resulted in  $TKN = 20$ , TKN will not be included in the effluent limits for this case.

If you have any questions about this, please let me know.

**Attachment J: Threatened and Endangered Species  
Screening Documents**



Department of Conservation & Recreation  
CONSERVING VIRGINIA'S NATURAL & RECREATIONAL RESOURCES

WebID: W634463255563750000

Client Project Number: VA0020346

### *PROJECT INFORMATION*

---

TITLE: Emporia WWTP

DESCRIPTION: minor industrial facility w/ 1.500 MGD design flow

EXISTING SITE CONDITIONS: receiving stream is nontidal

QUADRANGLES: EMPORIA

COUNTIES: City of Emporia

Latitude/Longitude (DMS): 364043/773135

Acreage: 3

Comments: Please contact me if you have any questions.

### *REQUESTOR INFORMATION*

---

Priority: No

Tier Level: 2

Tax ID:

Contact Name: Janine Howard

Company Name: DEQ-Piedmont Regional Office

Address: 4949-A Cox Road

City: Glen Allen

State: VA

Zip: 23060

Phone: 804-527-5046

Fax: 804-527-5106

Email: janine.howard@deq.virginia.gov

Conservation Site Name	Site Type	Brank	Acreage	Listed Species Presence
	GLNHR			NL
	GLNHR			NL
	GLNHR			NL
MEHERRIN RIVER SCU	SCU	B3	9	SL
Natural Heritage Conservation Sites within Search Radius				

Site-Name	Group-Name	common-name	scientific-name	GRANK	SRANK	Fed Status	st status	EO Rank	last obs date	precision
	Invertebrate Animal	Eastern Lampmussel	Lampsilis radiata	G5	S2S3			CD	1995-08-14	S
	Vascular Plant	Bush's Muhly	Muhlenbergia bushii	G5	S1			H	1938-09-20	G
	Vertebrate Animal	Dwarf Waterdog	Necturus punctatus	G4	S2S3			H	ND	G
MEHERRIN RIVER SCU	Invertebrate Animal	Green Floater	Lasmigona subviridis	G3	S2		LT	D	1995-08-14	S
MEHERRIN RIVER SCU	Invertebrate Animal	Roanoke Slabshell	Elliptio roanokensis	G3	S1			BC	1990-08-20	S
MEHERRIN RIVER SCU	Invertebrate Animal	Yellow Lampmussel	Lampsilis cariosa	G3G4	S2			C	1995-08-14	S
MEHERRIN RIVER SCU	Invertebrate Animal	Yellow Lance	Elliptio lanceolata	G2G3	S2S3	SOC		D	1990-08-20	S
Natural Heritage Resources within Search Radius										



Quads: EMPORIA

Counties: City of Emporia

## Emporia WWTP

Company: DEQ-Piedmont  
Regional Office

Lat/Long: 364043/773135



## COMMONWEALTH of VIRGINIA

### DEPARTMENT OF CONSERVATION AND RECREATION

The project mapped as part of this report has been searched against the Department of Conservation and Recreation's Biotics Data System for occurrences of natural heritage resources from the area indicated for this project. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in Biotics files, **NATURAL HERITAGE RESOURCES HAVE BEEN DOCUMENTED** within two miles of the indicated project boundaries.

You have submitted this project to DCR for a more detailed review for potential impacts to natural heritage resources. DCR will review the submitted project to identify the specific natural heritage resources in the vicinity of the proposed project. Using the expertise of our biologists, DCR will evaluate whether your specific project is likely to impact these resources, and if so how. DCR's response will indicate whether any negative impacts are likely and, if so, make recommendations to avoid, minimize and/or mitigate these impacts. If the potential negative impacts are to species that are state- or federally-listed as threatened or endangered, DCR will also recommend coordination with the appropriate regulatory agencies: the Virginia Department of Game and Inland Fisheries for state-listed animals, the Virginia Department of Agriculture and Consumer Services for state-listed plants and insects, and the United States Fish and Wildlife Service for federally listed plants and animals. If your project is expected to have positive impacts we will report those to you with recommendations for enhancing these benefits.

Please allow up to 30 days for a response.

We will review the project based on the information you included in the Project Info submittal form, which is included in the report that follows. Often additional information can help us make a more accurate and detailed assessment of a project's potential impacts to natural heritage resources. If you have additional information that you believe will help us better assess your project's potential impacts, you may send that information to us. Please refer to the project Title (from the first page of this report) and include this pdf file with any additional information you send us.

Thank you for submitting your project for review to the Virginia Natural Heritage Program through the NH Data Explorer. Should you have any questions or concerns about DCR, the Data Explorer, or this report, please contact the Natural Heritage Project Review Unit at 804-371-2708.

its.

Douglas W. Domenech  
Secretary of Natural Resources



David A. Johnson  
Director

**COMMONWEALTH of VIRGINIA**  
**DEPARTMENT OF CONSERVATION AND RECREATION**

Division of Natural Heritage  
213 Governor Street  
Richmond, Virginia 23219-2010  
(804) 786-7951

August 8, 2011

Janine Howard  
DEQ-PRO  
4949-A Cox Road  
Glen Allen, VA 23060

Re: VA0020346, Emporia WWTP

Dear Ms. Howard:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, the Meherrin River Stream Conservation Unit (SCU) is in the project vicinity. SCUs identify stream reaches that contain aquatic natural heritage resources, including 2 miles upstream and 1 mile downstream of documented occurrences, and all tributaries within this reach. SCUs are given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain; on a scale of 1-5, 1 being most significant. The Meherrin River has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resources of concern associated with this SCU are:

<i>Lampsilis cariosa</i>	Yellow lampmussel	G3G4/S2/NL/NL
<i>Lasmigona subviridis</i>	Green floater	G3/S2/NL/LT
<i>Elliptio lanceolata</i>	Yellow lance	G2G3/S2S3/SOC/NL
<i>Elliptio roanokensis</i>	Roanoke slabshell	G3/S1/NL/NL

The Yellow lampmussel ranges from Nova Scotia to Georgia in Atlantic slope drainages (NatureServe, 2009). In Virginia, it is recorded from the Roanoke, Chowan, James, York, and Potomac drainages. It is found in larger streams and rivers where good currents exist over sand and gravel substrates and in small creeks and ponds (Johnson, 1970).

The Green floater, a rare freshwater mussel, ranges from New York to North Carolina in the Atlantic Slope drainages, as well as the New and Kanawha River systems in Virginia and West Virginia (NatureServe, 2009). In Virginia, there are records from the New, Roanoke, Chowan, James, York, Rappahannock, and Potomac River drainages. Throughout its range, the Green floater appears to prefer the pools and eddies with gravel and sand bottoms of smaller rivers and creeks, smaller channels of large

rivers (Ortman, 1919) or small to medium-sized streams (Riddick, 1973). Please note that this species has been listed as state threatened by the VDGIF.

The Yellow lance occurs in mid-sized rivers and second and third order streams. To survive, it needs a silt-free, stable streambed and well-oxygenated water that is free of pollutants. This species has been the subject of taxonomic debate in recent years (NatureServe, 2009). Currently in Virginia, the Yellow lance is recognized from populations in the Chowan, James, York, and Rappahannock drainages. Its range also extends into Neuse-Tar river system in North Carolina. In recent years, significant population declines have been noted across its range (NatureServe, 2009). Please note that this species is currently classified as a species of concern by the United States Fish and Wildlife Service (USFWS); however, this designation has no official legal status.

The Roanoke slabshell is a relatively large freshwater mussel species that is typically found in riffle habitats of large rivers. This species probably is rather sessile with only limited movement in the substrate. Passive downstream movement may occur when mussels are displaced from the substrate during floods. The Roanoke slabshell is most closely associated with large Atlantic slope rivers from the Savannah River Basin to the Chowan River Basin (NatureServe, 2009). Tributary creeks and rivers occasionally provide significant habitat. The best populations occur where anadromous fish (probable primary fish hosts) have access to lotic habitats. Small or declining populations may be found above dams and their associated reservoirs which serve as barriers to anadromous fish. Presently, this species is usually found in near-shore trough habitats in sand/gravel substrates. It may also be found in more coarse substrates. The species was probably an abundant, dominant mussel within its historical range during past centuries, but its populations are now significantly reduced due to factors such as pollution, siltation, and the creation of reservoirs along rivers.

The Dwarf waterdog (*Necturus punctatus*, G4/S2S3/NL/NL), has been historically documented in the project vicinity. The Dwarf waterdog, a state rare salamander, is known from Atlantic slope drainages from Virginia to Georgia (Petranka, 1998). In Virginia, it inhabits small, slow-flowing streams in the Chowan River drainages, where the juveniles burrow in the silty bottoms. In the winter, the adults congregate in leaf beds. Waterdogs are completely aquatic and have four toes on each hind foot and conspicuous gills that are retained throughout life (Martof et al., 1980).

Threats to the Dwarf waterdog may include habitat alterations such as impoundments and channels; however, populations seem to be stable and they do not seem to be affected by moderate siltation and pollution (AmphibiaWeb, 2010).

Considered good indicators of the health of aquatic ecosystems, freshwater mussels are dependent on good water quality, good physical habitat conditions, and an environment that will support populations of host fish species (Williams et al., 1993). Because mussels are sedentary organisms, they are sensitive to water quality degradation related to increased sedimentation and pollution. They are also sensitive to habitat destruction through dam construction, channelization, and dredging, and the invasion of exotic mollusk species.

To minimize impacts to aquatic resources, DCR recommends the use of uv/ozone to replace chlorination disinfection and utilization of new technologies as they become available to improve water quality. Due to the legal status of the Green floater, DCR also recommends coordination with the VDGIF to ensure compliance with protected species legislation.

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.


Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (DCR), DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The Virginia Department of Game and Inland Fisheries maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from <http://vafwis.org/fwis/> or contact Shirl Dressler at (804) 367-6913.

Should you have any questions or concerns, feel free to contact me at 804-371-2708. Thank you for the opportunity to comment on this project.

Sincerely,

A handwritten signature in black ink, appearing to read "S. Rene' Hypes", with a stylized flourish at the end.

S. Rene' Hypes  
Project Review Coordinator

CC: Ernie Aschenbach, VDGIF  
Tylan Dean, USFWS

#### Literature Cited

AmphibiaWeb: Information on amphibian biology and conservation. [web application]. 2010. Berkeley, California: AmphibiaWeb. Available: <http://amphibiaweb.org/>. (Accessed: Apr 22, 2010).

Johnson, R.I. 1970. The systematics and zoogeography of the Unionidae (Mollusca: Bivalvia) of the southern Atlantic slope region. *Bulletin Museum of Comparative Zoology* vol 140(6): 362-365.

Martof, B. S., W. M. Palmer, J. R. Bailey, and J. R. Harrison. 1980. *Amphibians and Reptiles of the Carolinas and Virginia*. The University of North Carolina Press. Chapel Hill, VA. p. 51.

Michaelson, D.L. and R.J. Neves. 1995. Life history and habitat of the endangered Dwarf wedgemussel *Alasmodonta heterodon* (Bivalvia:Unionidae). *Journal of the North American Benthological Society* 14(2): 324-340.

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: April 5, 2010, April 13, 2010, April 27, 2010).

Ortman, A.E. 1919. A monograph of the naiades of Pennsylvania, Part 3: Systematic account of the genera and species. *Mem. Carnegie Mus.* 8:1-384.

Petranka, J. W. 1998. *Salamanders of the United States and Canada*. Smithsonian Institution Press, Washington, D.C. 587 pp.

Riddick, M.B. 1973. Freshwater mussels of the Pamunkey River system, Virginia. M.S. Thesis, Virginia Commonwealth University, Richmond, VA 105pp.

U.S. Fish and Wildlife Service. 1993. Dwarf Wedge Mussel (*Alasmodonta heterodon*) Recovery Plan. Hadley, Massachusetts. p. 52.

Williams, J.D., M.L. Warren, Jr., K.S. Cummings, J.L. Harris, and R.J. Neves. 1993. Conservation status of freshwater mussels of the United States and Canada. *Fisheries* 18: 6-9.

## Howard, Janine (DEQ)

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**From:** Howard, Janine (DEQ)  
**Sent:** Friday, September 16, 2011 11:08 AM  
**To:** Hypes, Rene (DCR)  
**Subject:** RE: VA0020346, Emporia WWTP  
**Attachments:** image001.jpg

René,

Thank you for your detailed review and response to our T&E coordination effort. Coordination with VDGIF was initiated today to allow them the opportunity to comment on the permit reissuance and the presence of the Green floater in the Meherrin River Stream Conservation Unit.

Note is made of your recommendation of the use of UV or ozone disinfection to replace chlorination as the means of effluent bacteria reduction. I am pleased to tell you that this facility already utilizes UV technology to disinfect their effluent rather than chlorine.

Please let me know if you have any questions or concerns and again, thank you for your review.

Sincerely,

Janine

Janine L. Howard  
Water Permit Writer

DEQ Piedmont Regional Office  
4949-A Cox Road  
Glen Allen, VA 23060  
t: (804) 527-5046  
f: (804) 527-5106

This email should not be considered a legal opinion or a case decision as defined by the Administrative Process Act, Code of Virginia § 2.2-4000 *et seq.*

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**From:** nhreview (DCR)  
**Sent:** Monday, August 08, 2011 1:13 PM  
**To:** Howard, Janine (DEQ)  
**Cc:** ProjectReview (DGIF); 'Tylan\_Dean@fws.gov'  
**Subject:** VA0020346, Emporia WWTP

Ms. Howard,

Please find attached the Department of Conservation and Recreation, Division of Natural Heritage (DCR-DNH) comments for the above referenced project. The comments are in pdf format and can be printed for your records. Also species rank information is available at [http://www.dcr.virginia.gov/natural\\_heritage/help.shtml](http://www.dcr.virginia.gov/natural_heritage/help.shtml) for your reference.

Please send a confirmation e-mail upon receipt of our comments. Let us know if you have any questions.

Thank you for the opportunity to comment on this project.

René

S. Rene' Hypes  
Project Review Coordinator  
DCR-DNH  
217 Governor Street

Richmond, Virginia 23219  
804-371-2708 (phone)  
804-371-2674 (fax)  
[rene.hypes@dcr.virginia.gov](mailto:rene.hypes@dcr.virginia.gov)



**Conserving VA's Biodiversity through  
Inventory, Protection and Stewardship**  
[www.dcr.virginia.gov/natural\\_heritage](http://www.dcr.virginia.gov/natural_heritage)  
[Virginia Natural Heritage Program on Facebook](#)

## Howard, Janine (DEQ)

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**From:** Howard, Janine (DEQ)  
**Sent:** Tuesday, February 14, 2012 11:38 AM  
**To:** Aschenbach, Ernie (DGIF)  
**Subject:** RE: ESSLog 32284; VPDES permit#0020346 re-issuance for the Emporia WWTP in Emporia, Virginia

Mr. Aschenbach,

Per your request to be informed if any proposed limitations change, I am writing to inform you that a new toxicity limit is planned for the 2012 Emporia WWTP permit. No other limitations have changed. I have attached the proposed limits page, with the new limitations highlighted. I have also attached the Whole Effluent Toxicity evaluation that lead to the proposed toxicity limit. Please let me know if you require any further information. If I do not hear from you within 30 days of the date of this email I will assume that the T&E evaluation and coordination is complete.

Sincerely,

Janine L. Howard  
Water Permit Writer

DEQ Piedmont Regional Office  
4949-A Cox Road  
Glen Allen, VA 23060  
t: (804) 527-5046  
f: (804) 527-5106

This email should not be considered a legal opinion or a case decision as defined by the Administrative Process Act, Code of Virginia § 2.2-4000 *et seq.*



WET memo  
2\_13\_12.pdf



limits page.pdf



/A0020346 Emporia  
WWTP Toxicit...

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**From:** Howard, Janine (DEQ)  
**Sent:** Tuesday, November 08, 2011 12:56 PM  
**To:** Aschenbach, Ernie (DGIF)  
**Subject:** RE: ESSLog 32284; VPDES permit#0020346 re-issuance for the Emporia WWTP in Emporia, Virginia

Mr. Aschenbach,

Thank you for your T & E review of the Emporia WWTP reissuance. This facility already utilizes UV disinfection and does not chlorinate its effluent. If new water-quality based limits are generate based on effluent data provided in the pending permit application, I will provide VDGIF with an updated limits page. If no new limitations are generated for the 2012 permit, then I will consider the T&E review complete.

Sincerely,

Janine L. Howard  
Water Permit Writer

DEQ Piedmont Regional Office  
4949-A Cox Road  
Glen Allen, VA 23060  
t: (804) 527-5046  
f: (804) 527-5106

This email should not be considered a legal opinion or a case decision as defined by the Administrative Process Act, Code of Virginia § 2.2-4000 et seq.

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**From:** Aschenbach, Ernie (DGIF)  
**Sent:** Thursday, November 03, 2011 12:03 PM  
**To:** Howard, Janine (DEQ)  
**Cc:** nhreview (DCR); Watson, Brian (DGIF)  
**Subject:** ESSLog 32284; VPDES permit#0020346 re-issuance for the Emporia WWTP in Emporia, Virginia

We have reviewed the above-referenced VPDES permit re-issuance. The existing design flow is 1.982 million gallon per day (MGD). The receiving stream is the Meherrin River. The 7Q10 of the receiving river is 12 MGD. Effluent limitation information is not provided with the DEQ request for DGIF review. According to DEQ, the permit application is due 11/15/2011 and will include comprehensive effluent data.

According to our records, the Meherrin River is designated Threatened and Endangered (T&E) species water for the state Threatened (ST) green floater. The Meherrin River is also a designated anadromous fish use water.

We recommend UV disinfection rather than chlorination, if not already in place. Provided the project adheres to the effluent limitations and monitoring requirements specified in the permit (and remain similar to those specified within the existing permit), we do not anticipate the re-issuance of this existing permit to result in adverse impact to designated potential T&E species waters or their associated listed species.

If future effluent limitations proposed in the pending application for permit re-issuance change, we recommend DEQ provide updated effluent characteristics information to DGIF for our consideration. After reviewing this new information DGIF will provide further guidance protective of freshwater mussels as appropriate.

---

Thank you for the opportunity to provide comments.

Ernie Aschenbach  
Environmental Services Biologist  
Virginia Dept. of Game and Inland Fisheries  
4010 West Broad Street  
Richmond, VA 23230  
Phone: (804) 367-2733  
FAX: (804) 367-2427  
Email: [Ernie.Aschenbach@dgif.virginia.gov](mailto:Ernie.Aschenbach@dgif.virginia.gov)

**Attachment K: Groundwater Evaluation, Monitoring Well  
Location Map, and Corrective Action Plan (CAP) Phase II  
Approval Letter and Memo**

# MEMORANDUM

## DEPARTMENT OF ENVIRONMENTAL QUALITY *Piedmont Regional Office*

4949-A Cox Road, Glen Allen, VA 23060-6296

804/527-5020

**SUBJECT:** City of Emporia Wastewater Treatment Plant (VA0020346) Groundwater Evaluation

**TO:** File

**FROM:** Janine Howard

**DATE:** September 21, 2011

Process and Background:

The City of Emporia Wastewater Treatment Plant is a major municipal facility with a design flow of 1.5 MGD. The facility is located at 500 Tall Oaks Drive in Emporia, Virginia. The plant sits on about 55 acres and is bounded on the south and east by Falling Run Creek, a tributary of the Meherrin River. The facility serves a population of approximately 5,900 individuals with 2,500 connections. The WWTP is comprised of a 22-acre sludge lagoon, a clarifier and secondary clarifier, oxidation ditches, screening and grit removal, and administrative/laboratory buildings. Under normal operating conditions the sludge lagoon is approximately three feet in depth with two feet of freeboard. The lagoon has been in place since its installation in 1964 and it is unlined. The wastewater treatment plant was first built in 1988 and at the time, the lagoon was the sole form of treatment.

Historically, the facility disposed of its sludge in the sludge lagoon, however in May 2005 a Siemens Water Technologies Corp. "Cannibal" Solids Reduction System was installed at the facility. The "Cannibal" system is designed to significantly reduce the amount of sludge produced at the plant (formerly around 52 dry metric tons per year). The permittee planned to suspend the use of the lagoon sludge disposal but retained the structure as an emergency equalization basin. According to the 2009 inspection report by Charles Stitzer, the "Cannibal" system has not performed as well as expected and while it has reduced the amount of waste solids, the reduction has not been as significant as was hoped. Presently, a small portion of grit that is collected in the screening system preceding the Cannibal system is diverted directly to the sludge lagoon. In addition, the clarifiers are occasionally drained to the sludge lagoon during routine maintenance. Work continues on the "Cannibal" system to improve its efficiency and further reduce its discharge of solids. Once the system is fully operational, it is anticipated that waste sludge will be land-filled. To date, the WWTP continues to dispose of sludge in the lagoon.

The groundwater monitoring plan was designed to allow evaluation of the integrity of the sludge lagoon, and was approved on March 23, 1987. Beginning with the 1996 evaluation of the available data, contamination of groundwater became apparent at MW-2. Contamination issues were also remarked upon in the 2001 evaluation. The 2007 evaluation concluded that the sludge lagoon was having an effect on the groundwater at the site, and noted exceedances of the State of Virginia nitrate and chloride standards at MW-2. As a result, the 2007 permit reissuance required the development of a Corrective

Action Plan (CAP) to ensure that the source of the contamination was eliminated or that the contaminant plume is contained on the permittee's property.

The original groundwater monitoring plan, approved in 1987, consisted of three monitoring wells. MW-1, MW-2, and MW-3 were installed on March 10-11, 1988. MW-1, located on the northwest corner of the lagoon, is the up-gradient well. MW-2 is located on the southeast corner of the lagoon is hydraulically down-gradient of the lagoon. MW-3 is located on the northeast corner of the lagoon. The most recent monitoring well, MW-4, is located south of MW-2, approximately halfway between the lagoon and Falling Run Creek. MW-4 was installed in 2008 as part of the Corrective Action Plan (CAP) required by the 2007 permit. Refer to the attached map for the well locations.

#### Corrective Action Plan Summary:

The City of Emporia hired Earth Tech, an operating subsidiary of AECOM, to aid in the development of the CAP. The CAP was approached in two phases. The first phase of the CAP was submitted on 3/27/08 and approved on 4/24/2008. This phase of the CAP investigated the hydraulic flow of the groundwater on site in order to determine an appropriate location for an additional down-gradient well. The investigation found that the hydraulic groundwater flow is due south toward Falling Run Creek and that the gradient is nearly flat with a slope of 0.0015. Hydraulic conductivity was tested using single well aquifer tests ("slug tests") and was determined to be between 23-157 ft/day. Groundwater flow velocity was estimated to be 42-286 ft/year. The receptors of the groundwater were also investigated and Falling Run Creek, down-gradient of the sludge lagoon, was determined to be the sole receptor. Phase I of the CAP required a sludge sample to be tested for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver, copper, and zinc). The sludge analysis results were all less than the quantification limitation and as such groundwater pollution VOCs, SVOCs, and metals from the lagoon is not a concern at present. Phase I of the CAP also called for surface water sampling at three locations: upstream of the property boundary, down-gradient of the lagoon, and downstream of the property boundary. The purpose of the surface water testing of Falling Run Creek was to establish whether or not the groundwater contamination was having a perceived impact on the receptor of the contamination, Falling Run Creek.

Phase II of the CAP was submitted on 11/21/2008. The surface water testing indicated that transport of nitrate and chlorides from the lagoon to Falling Run Creek had not occurred and analyses of the surface water samples as compared to water quality standards suggest that contamination from the lagoon is not adversely impacting Falling Run Creek. Falling Run Creek, located at the property boundary, was identified in Phase I as the sole receptor of the groundwater pollution. DEQ Guidance Memo 98-2010 requires that if groundwater contamination is detected at down-gradient wells or at the property boundary, then the lagoon must be relined or closed, with one exception. If the receptor of the groundwater contamination is shown to be un-impacted by the groundwater, then no action is needed. Phase II of the Emporia WWTP CAP showed no adverse impacts were felt by Falling Run Creek, the sole groundwater contaminant receptor, therefore the closure/lining of the lagoon was not required by DEQ. The CAP called for continued annual monitoring at the three existing and one new (MW-4) monitoring well. In addition, annual monitoring of four surface water locations (ST-1, ST-2, ST-3, ST-4) for nitrates, chlorides and TOC is required. This will allow for continued monitoring of the groundwater impact on Falling Run Creek. DEQ approved Phase II of the CAP on 2/6/2009.

Groundwater Elevation:

Monitoring data from 1996-2010 were available for evaluation. For the purpose of this evaluation only data submitted following approval of the CAP is displayed. The permit record is clear in that data submitted prior to the CAP has shown alleged degradation of the groundwater from the lagoon. The CAP verified the hydraulic flow of the groundwater, determined that surface water impacts in Falling Run Creek (the sole receptor) were nominal and implemented a fourth groundwater monitoring well and annual surface water monitoring to ensure continued compliance with State Water Quality Standards. Due to the lack of a statistically significant dataset, a statistical analysis was not performed, rather the data is displayed and discussed to date. As required by the approved CAP, groundwater is monitored annually. Parameters monitored and reported include: groundwater elevation, pH, specific conductance, nitrate-nitrogen, total organic carbon, and chlorides.

The facility is located in the Coastal Plain Physiographic Province for which there are specific standards (9VAC25-280-50) and criteria (9VAC25-280-70). Virginia also has groundwater standards that are applicable statewide (9VAC25-280-40). The Antidegradation policy for groundwater (9VAC 25-280-30) requires that the natural quality for all groundwater constituents shall be maintained. This means that in addition to constituents that are assigned numeric criteria in the groundwater standards, the policy also applies to constituents that are not specifically identified or assigned a numeric groundwater standard.

pH:

The groundwater criterion for pH in the Coastal Plain physiographic province is 6.5-9.0 SU. The pH at all monitoring wells, including the up-gradient well, was more acidic than the State groundwater standard established in 9 VAC 25-280-50. pH below the water quality standard is well documented for MW-1, MW-2, and MW-3 and has been observed since 1996. Given the historic acidity of the background, up-gradient well, the sludge lagoon is not considered to be degrading the groundwater pH.

Specific Conductivity:

There are no numeric groundwater criteria for specific conductivity. Specific conductivity is an indication of ions in the groundwater and is suggestive of the presence of other pollutants such as chlorides, nitrates, phosphates and sodium in the groundwater. Specific conductance averaged 104.95 M-M/CM at MW-1, 493.5M-M/CM at MW-2, 94.05M-M/CM at MW-3, and 449.5M0M/CM at MW-4. The increased specific conductance at the down-gradient wells (MW-2 and MW-4) is a continued indication of elevated concentrations of pollutants in the groundwater down-gradient of the lagoon, relative to the ionic concentration of groundwater up-gradient of the sludge lagoon. Note the specific conductance at MW-2 has dropped slightly from 2009 to 2010, whereas the reverse is true for MW-4.

Total Organic Carbon (TOC):

The TOC groundwater criterion is 10 mg/L for the Coastal Play physiographic province. The average TOC concentrations at MW-1, MW-2, MW-3, and MW-4 were 3.3, 2.7, 3.45, and 21.6 mg/L respectively. TOC met the groundwater criterion for all monitoring wells except at MW-4. The spike in TOC in 2010 is notable as TOC has not historically been chronically elevated at MW-4. The TOC concentration at MW-4 was more than seven times greater in 2010 as compared to 2009. Continued monitoring is needed to gain a larger dataset to assess TOC at MW-4. With the exception of MW-4, TOC decreased in 2010 as compared to 2009.

Chloride:

The chloride water quality criterion for the Coastal Plain Physiographic Province is 50 mg/L. The average up-gradient (MW-1) concentration was 5.75 mg/L. At MW-2 and MW-3, average chloride concentrations were 96.6 and 5.15 mg/L respectively. Chloride concentration averaged 63.6 mg/L at MW-4. The 2010 chloride concentration for MW-4 was 122 mg/L, a large increase from the year before. Chloride concentration at the remainder of the wells decreased from 2009 to 2010. Chloride concentrations at MW-2 and MW-4 were in alleged violation of the groundwater quality criteria.

Nitrate Nitrogen (NO<sub>3</sub>-N):

The groundwater quality criterion for nitrate-nitrogen in the coastal Plain is 5 mg/L. Nitrate-nitrogen concentrations at MW-1 and MW-3 are in conformance with the standard for 2009 and 2010. Nitrate nitrogen was not detected in MW-4. MW-2 continues to exceed groundwater quality standards set in 9 VAC 25-280-50 for nitrate-nitrogen.

Summary and Recommendation:

The pH recorded at all monitoring wells during 2009-2010 are in alleged violation of the groundwater quality standards. Up-gradient MW-1 had a lower pH than MW-2 and MW-4. Continued monitoring should be conducted to gather sufficient data for evaluation.

Specific conductivities were highest in MW-2 and MW-4. High specific conductivities are suggestive of groundwater pollution. The highest chloride concentrations were found in MW-2 and MW-4, supporting the specific conductivity data. The nitrate-nitrogen concentration was also the highest at MW-2.

The increasing chloride concentrations at the newly established MW-4 suggest that the contaminant plume is migrating. The lack of detection of nitrate-nitrogen at MW-4, counters this argument however. The lagoon is still used for sludge storage, although the volumes have been reduced since the addition of the "Cannibal" system in 2005. The reduction of waste being directed to the sludge lagoon may mitigate groundwater impacts over time. Continued monitoring is necessary to collect a statistically significant dataset.

In-stream Monitoring Summary:

In-stream monitoring has been completed for two years, 2009 and 2010. The raw data is available in Tables A.5 and A.6 in the appendix. There are four monitoring stations, ST-1, ST-2, ST-3, and ST-4. ST-3 is located upstream of the property boundary, ST-1 is downstream of the property boundary, ST-2 is downgradient of MW-2 and MW-4, and ST-4 is located east of MW-2. The first two years of stream sampling data show that nitrate-nitrogen pollution from the groundwater is not impacting Falling Run Creek, as the pollutant was not detected at all sampling stations in 2009 and 2010. The pH of the stream appears slightly acidic and is below the aquatic life standard of 6.0 SU. However, ST-3, upstream of the property boundary has a pH of less than 6.0 S.U., therefore the groundwater down-gradient of the lagoon is not perceived to be a factor in the low surface water pH at ST-1, ST-2, and ST-4. In 2009 and 2010, the upstream station had the highest specific conductance, with the conductivity of the water dropping at ST-2 and ST-4, the stations nearest the contaminated wells (MW-2 and MW-4). Chlorides are found in concentrations below the aquatic life standard and were also documented in the largest concentrations at the upstream station (ST-3). This trend was similarly true for total organic carbon. In summary, the in-stream monitoring suggests that the groundwater contamination from the lagoon is having no adverse affect on the receptor, Falling Run Creek, at this time. Continued monitoring in accordance with the approved CAP is recommended.

## Appendix

Note: "ND" means non detect

Table A.1. MW-1 (upgradient well) raw groundwater data.

Date	Ground Water Elevation (ft. MSL)	pH (S.U.)	Specific Conductance (M-M/CM)	Nitrate Nitrogen (NO <sub>3</sub> N) (mg/L)	Total Organic Carbon (TOC) (mg/L)	Chlorides (mg/L)
2010	18.66	4.68	91.90	1.80	ND	5.40
2009	18.08	5.12	118.00	1.60	3.30	6.10
<b>Average</b>	18.37	4.90	104.95	1.70	3.30	5.75
<b>Standard</b>	<b>n/a</b>	<b>6.5-9.0</b>	<b>n/a</b>	<b>5</b>	<b>10</b>	<b>50</b>

Table A.2 MW-2 raw groundwater data

Date	Ground Water Elevation (ft. MSL)	pH (S.U.)	Specific Conductance (M-M/CM)	Nitrate Nitrogen (NO <sub>3</sub> N) (mg/L)	Total Organic Carbon (TOC) (mg/L)	Chlorides (mg/L)
2010	16.83	5.13	486	12.9	2.6	90.2
2009	16.83	5.26	501	20.5	2.8	103
<b>Average</b>	16.83	5.195	493.5	16.7	2.7	96.6
<b>Standard</b>	<b>n/a</b>	<b>6.5-9</b>	<b>n/a</b>	<b>5</b>	<b>10</b>	<b>50</b>

Table A.3. MW-3 raw groundwater data

Date	Ground Water Elevation (ft. MSL)	pH (S.U.)	Specific Conductance (M-M/CM)	Nitrate Nitrogen (NO3N) (mg/L)	Total Organic Carbon (TOC) (mg/L)	Chlorides (mg/L)
2010	9.0	4.81	103	0.93	2.9	2.9
2009	11.33	4.69	85.1	0.70	4.0	7.4
<b>Average</b>	10.165	4.75	94.05	0.815	3.45	5.15
<b>Standard</b>	<b>n/a</b>	<b>6.5-9</b>	<b>n/a</b>	<b>5</b>	<b>10</b>	<b>50</b>

Table A.4. MW-4 raw groundwater data

Date	Ground Water Elevation (ft. MSL)	pH (S.U.)	Specific Conductance (M-M/CM)	Nitrate Nitrogen (NO3N) (mg/L)	Total Organic Carbon (TOC) (mg/L)	Chlorides (mg/L)
2010	9.5	5.15	477	ND	37.9	122
2009	10.16	5.46	422	ND	5.3	5.3
<b>Average</b>	9.83	5.305	449.5		21.6	63.6
<b>Standard</b>	<b>n/a</b>	<b>6.5-9</b>	<b>n/a</b>	<b>5</b>	<b>10</b>	<b>50</b>

Table A.5 2009 (10/08-10/09) Stream Sampling Raw Data

Parameter	Sampling Station				
	ST-1	ST-2	ST-3	ST-4	Aquatic Life Standard
pH (S.U.)	6.45	5.95	5.79	5.79	6.0-9.0
Specific Conductivity (M-M/CM)	292	166	373	177	NA
Nitrate-Nitrogen (mg/L)	ND	ND	ND	ND	NA
Total Organic Carbon (mg/L)	18.8	32.2	63.0	30.3	NA
Chlorides (mg/L)	18.8	35.2	99.3	34.8	860

Table A.6 2010 (10/09-10/10) Stream Sampling Raw Data

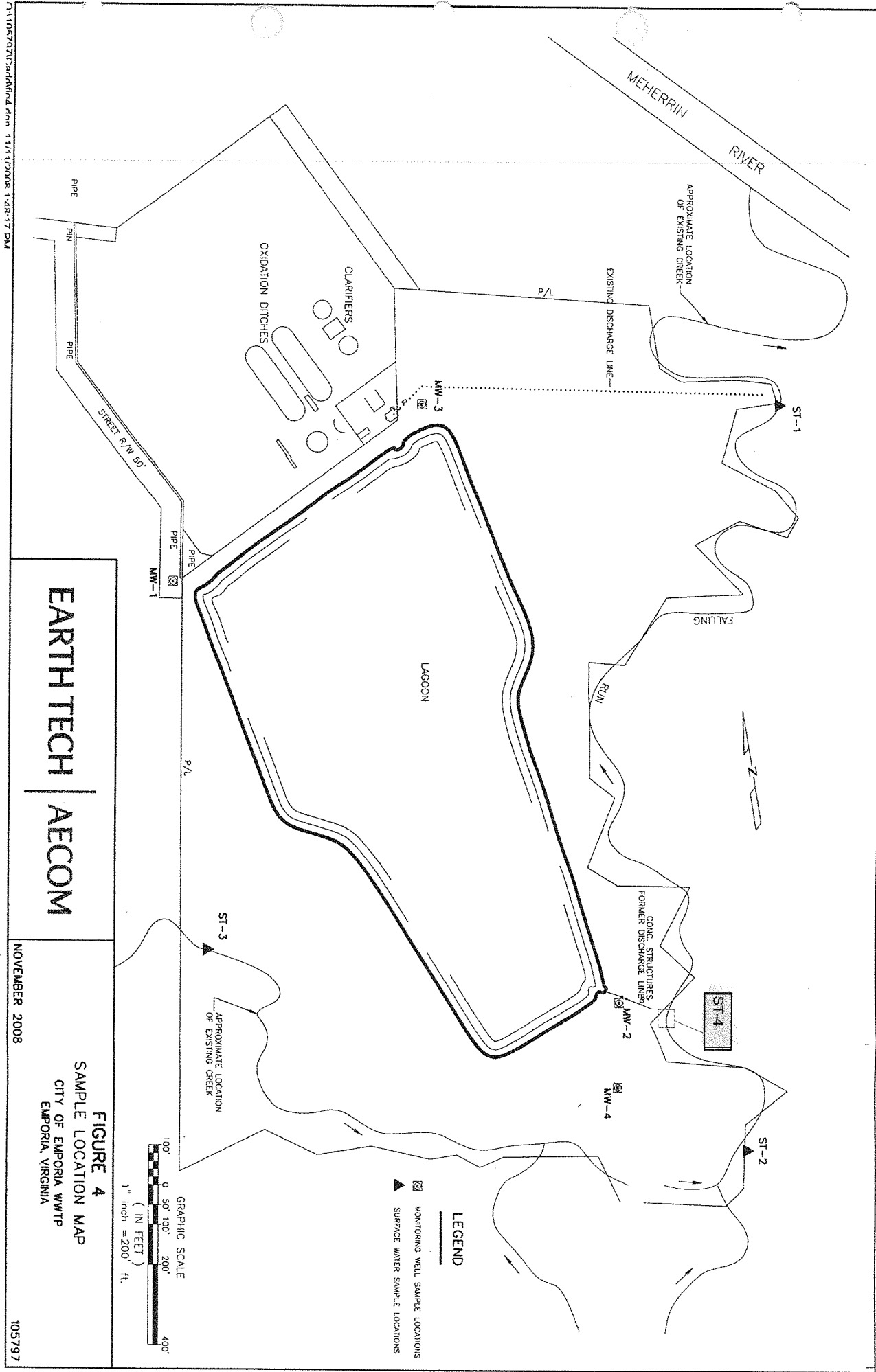
Parameter	Sampling Station				
	ST-1	ST-2	ST-3	ST-4	Aquatic Life Standard
pH (S.U.)	4.48	5.02	4.70	4.34	6.0-9.0
Specific Conductivity (M-M/CM)	291	288	689	297	NA
Nitrate-Nitrogen (mg/L)	ND	ND	ND	ND	NA
Total Organic Carbon (mg/L)	18.6	87.6	66.7	31.7	NA
Chlorides (mg/L)	30.5	29.0	112	28.4	860

ST-1 = downstream property boundary

ST-2 = down-gradient of MW-2 and MW-4

ST-3 = upstream property boundary

ST-4 = east of MW-2





# COMMONWEALTH of VIRGINIA

## DEPARTMENT OF ENVIRONMENTAL QUALITY PIEDMONT REGIONAL OFFICE

Preston Bryant  
Secretary of Natural Resources

4949-A Cox Road, Glen Allen, Virginia 23060  
(804) 527-5020 Fax (804) 527-5106  
[www.deq.virginia.gov](http://www.deq.virginia.gov)

David K. Paylor  
Director

February 6, 2009

Larry Epps  
Superintendent of Wastewater Treatment  
City of Emporia  
P.O. Box 511  
Emporia, Virginia 23847

RE: VPDES Permit No. VA0020346 – City of Emporia WWTP  
Phase II of the Corrective Action Plan (CAP)

Dear Mr. Epps:

The Department of Environmental Quality (DEQ) has reviewed the above referenced CAP submitted November 21, 2008. Approval of the CAP is contingent upon the following modification. The permittee shall collect and analyze surface water samples from the locations proposed in the CAP and a fourth location identified by DEQ staff in the enclosed map on an annual basis. This action is in accordance with a memorandum dated January 30, 2008, a copy of which is enclosed for your information.

DEQ staff request that the City of Emporia respond within 30 days either accepting the proposed changes or making an alternate proposal. Upon written concurrence from the City of Emporia, this CAP will be incorporated by reference into the City of Emporia's WWTP Permit No. VA0020346.

The facility's Operation and Maintenance Manual should also be revised to reflect the approved CAP. Please note that the Operation and Maintenance Manual must be revised and submitted for DEQ approval within 90 days of the effective date of the changes.

Please contact Emilee Carpenter in the Piedmont Regional Office at 804/527-5072 or [eccarpenter@deq.virginia.gov](mailto:eccarpenter@deq.virginia.gov) if you have any questions.

Sincerely,

Curtis J. Linfderman, P.E.  
Water Permit Manager

Enclosure: Approval Memo, Surface Water Sample Location Map

CJL/ecc



## MEMORANDUM

### DEPARTMENT OF ENVIRONMENTAL QUALITY *Piedmont Regional Office*

4949-A Cox Road

Glen Allen, VA 23060

804/527-5020

SUBJECT: VPDES Permit No. VA0020346  
City of Emporia WWTP  
Corrective Action Plan (CAP) Phase II

TO: Curtis J. Linderman, P.E., Water Permit Manager

FROM: Emilee Carpenter, Water Permit Writer

DATE: January 30, 2009

COPIES: Larry Epps

Type of Report: Phase II of the Corrective Action Plan. Phase I was approved on April 24, 2008. Notification of Phase I completion and the Phase II proposal were submitted on November 21, 2008.

- 1) Description: The CAP was submitted in accordance with Part I.B.8 of the current VPDES permit. Ground water monitoring data submitted since 1996 indicates that the groundwater in the vicinity of the lagoon has been affected. Violations of the Groundwater Standard for nitrates and the Coastal Plain Water Quality Criterion for chlorides were observed. Phase I was designed to assess the nature, fate and transport of the pollutants, aquifer characteristics, estimated size and location of contaminant plume and calculations of the plume's movement with respect to potential receptors. Phase II is intended to evaluate the information collected in Phase I and to determine the appropriate response to the observed groundwater contamination.

Phase I demonstrated the following:

- 2) Groundwater flow direction is due south toward Falling Run, and the hydraulic gradient is nearly flat, with a slope measuring 0.0015.
- 3) Hydraulic conductivity was measured using slug tests. The results indicate conductivity values ranging from 23 ft/day to 157 ft/day. Groundwater flow velocity was calculated using hydraulic gradient, conductivity and the assumed effective porosity of sands to produce a range of 42 ft/year to 286 ft/year.
- 4) Based on the determined flow direction, a fourth monitoring well was installed downgradient of MW-2, approximately half-way between the lagoon and Falling Run.
- 5) A sludge sample from the lagoon was analyzed to identify potential pollutants in the groundwater. Results for VOCs, SVOCs, and metals

(arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver, copper and zinc) were all less than the quantification limit. Consequently, the City of Emporia was allowed to streamline subsequent groundwater and surface water analyses to consist of nitrates, chlorides, and total organic carbon.

- 6) Groundwater analyses continue to indicate that nitrates and chloride are present in the downgradient wells at concentrations above the groundwater standard (10 mg/L) for nitrates and the coastal plain groundwater criterion (50 mg/L) for chloride. Surface water results were all below surface water quality standards. No standard has been established for total organic carbon in surface water. However, a comparison of groundwater and surface water results indicates that surface water concentrations are significantly higher than groundwater concentrations. Therefore, groundwater does not appear to be the source of the total organic carbon concentrations observed in the surface water.

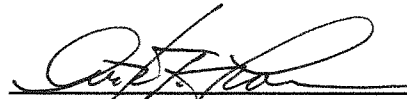
Phase II presents the following:

- 7) Analytical results indicate that transport of nitrates and chlorides from the lagoon to Falling Run has not occurred. Reconnaissance of the area and review of courthouse records show that no downgradient receptors are located between the lagoon and Falling Run. Since Falling Run is the property boundary and the nearest receptor, no risk of human exposure is anticipated. In addition, analyses of surface water samples in comparison with the surface water quality standards that protect aquatic life uses, suggest that contamination from the lagoon does not adversely impact Falling Run.
- 8) According to VDEQ Guidance Memo 98-2010, if contamination is detected in downgradient/property boundary wells, the lagoon must be relined or closed out, unless the unit is discharging via the groundwater to a surface water receptor either on the property or abutting the property boundary and in-stream monitoring indicates no adverse impact to the surface water.
- 9) As part of this CAP, the City of Emporia plans to monitor Wells MW-1, MW-2, MW-3, MW-4 on an annual basis, continue use of the lagoon for effluent overflow from the treatment plant, and collect and analyze surface water samples for nitrates, chloride and TOC at locations down gradient of wells MW-2 and MW-4 once every 5 years.

**Recommendations:**

The staff recommends approval of the CAP described above, contingent upon the following modification: Surface water samples shall be collected on an annual basis at the locations established in the CAP in addition to a fourth location identified in the attached map.

Approved:

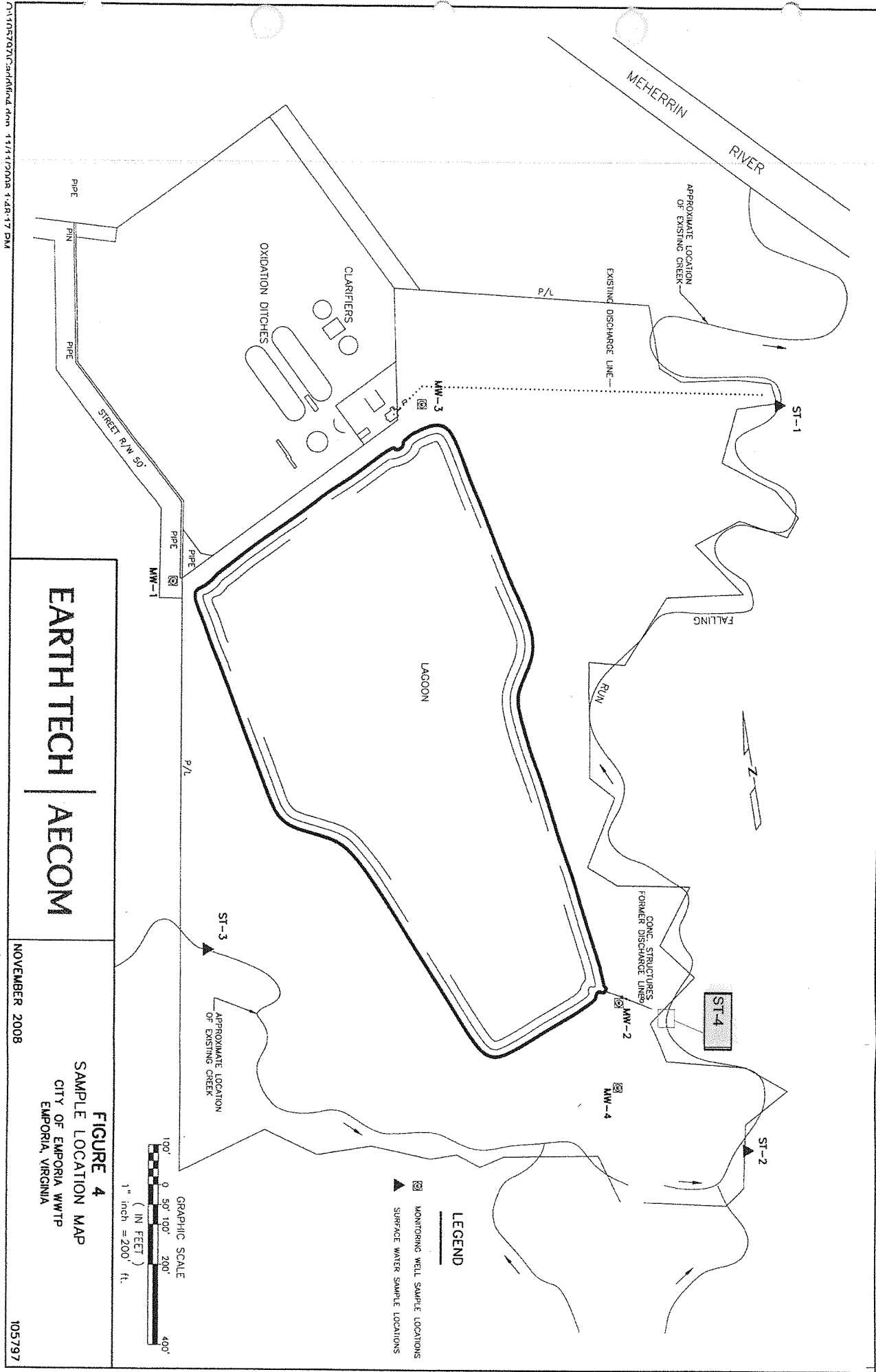


Curtis J. Linderman, P.E.

Water Permit Manager, Department of Environmental Quality

Date:

2/6/09



## **Attachment L: Whole Effluent Toxicity Memorandum**

# MEMORANDUM

## DEPARTMENT OF ENVIRONMENTAL QUALITY *Piedmont Regional Office*

4949-A Cox Road, Glen Allen, VA 23060-6296

804/527-5020

**SUBJECT:** Whole Effluent Toxicity (WET) Test Data Review and Permit Language:  
Emporia WWTP, VPDES VA0020346

**TO:** Deborah DeBiasi, CO- WET

**FROM:** Janine Howard

**DATE:** 12/5/11, revised 2/13/12, 3/14/12, 3/19/12, and 3/26/12

Facility Name: Emporia WWTP  
Permit Number: VA0020346  
Receiving Stream: Meherrin River  
Facility SIC: 4952  
Effluent Design Flow 1.5 MGD  
Instream Waste Concentration (IWC): 11%

### FACILITY DESCRIPTION

The 2007 permit for this facility expires May 13, 2012 and PRO is in the process of developing the 2012 permit. The City of Emporia Wastewater Treatment Plant is a major municipal facility with a design flow of 1.5 MGD. The facility is located at 500 Tall Oaks Drive in Emporia, Virginia, sits on about 55 acres and is bounded on the south and east by Falling Run Creek, a tributary of the Meherrin River. The facility serves a population of approximately 5,500 persons with 2,500 connections. The WWTP is comprised of a 22-acre sludge lagoon, a clarifier and secondary clarifier, oxidation ditches, screening and grit removal, and administrative/laboratory buildings. There is one permitted outfall (001) which discharges to the Meherrin River. The 2007 permit contains a Whole Effluent Toxicity (WET) special condition that requires annual chronic toxicity testing.

### FACILITY REQUIREMENTS

The 2007 WET special condition requires the following tests to be used: chronic 3-brood static renewal survival and reproduction test using *Ceriodaphnia dubia* and the chronic 7-day static renewal survival and growth test using *Pimephales promelas*. Both testing scenarios required 24-hour flow-proportioned effluent samples collected from Outfall 001. Per the 2007 permit, the test dilutions should be able to determine compliance with a No Observed Effect Concentration (NOEC) of greater than or equal to 8% in all of the tests conducted.

Prior to the 2007, acute toxicity testing had been required for the previous two permit terms and acute toxicity had never been shown by the tests. For this reason, acute toxicity testing requirements were not included in the 2007 permit.

### DATA SUMMARY

A review of five sets of the annual testing data, submitted by the facility in 2008, 2009, 2010, and 2011 shows that the toxicity test results were greater than or equal to the WET Program NOEC endpoint of 8% in the 2007 permit (see Tables 1 and 2). All toxicity tests were performed by Biological Monitoring, Inc and no quality control problems were found.

Statistical analysis of the *Pimephales promelas* toxicity data using Stats.exe (attached) showed no limit was necessary. However, statistical analysis of the *Ceriodaphnia dubia* data yielded a toxicity limit based on acute toxicity. The need for a limitation was verified by a second statistical evaluation of an expanded *C. dubia* toxicity data dataset, utilizing historical chronic toxicity data (Table 3). The limit ( $TU_a = 1.02$ ) will be applied as a maximum and a four year schedule of compliance will be afforded. Annual interim monitoring will be required until such time as the limitation becomes effective.

The proposed special condition language for the 2012 permit is included below. Also attached is the WETLIM10 spreadsheet which was used to compute the acute toxicity limit contained in the 2012 permit.

Table 1: Results of Chronic Toxicity Tests *P.promelas*.

TEST PERIOD	TEST DATE	TEST RESULT:	% SURVIVAL IN 100% EFFLUENT (7 day)	TEST Lab
1 <sup>st</sup> Annual	11/27/07- 12/4/07	NOEC= 100% S,G (TU <sub>c</sub> = 1.0)	97.5%	Biological Monitoring Inc.
2 <sup>nd</sup> Annual	10/28/11- 11/4/08	NOEC= 100% S,G (TU <sub>c</sub> = 1.0)	100%	Biological Monitoring Inc.
3 <sup>rd</sup> Annual	10/20/09- 10/27/09	NOEC= 100% S,G (TU <sub>c</sub> = 1.0)	100%	Biological Monitoring Inc.
4 <sup>th</sup> Annual	10/26/10- 11/2/10	NOEC= 100% S,G (TU <sub>c</sub> =1.0)	97.5%	Biological Monitoring Inc.
5 <sup>th</sup> Annual	10/25/11- 11/1/11	NOEC= 100% S,G (TU <sub>c</sub> = 1.0)	95%	Biological Monitoring Inc.

S= survival, G= growth

Table 2: Results of Chronic Toxicity Tests *C. dubia*.

TEST SUBMITTAL PERIOD	TEST DATE	TEST RESULT	% SURVIVAL IN 100% EFFLUENT (7 day)	TEST Lab
1 <sup>st</sup> Annual	11/27/07- 12/3/07	NOEC= 100% S,R (TU <sub>c</sub> = 1.0)	100%	Biological Monitoring Inc.
2 <sup>nd</sup> Annual	10/28/08- 11/3/08	NOEC= 100% S (TU <sub>c</sub> = 1.0) <b>NOEC= 8% R</b> (TU <sub>c</sub> = 12.5)	100%	Biological Monitoring Inc.
3 <sup>rd</sup> Annual	10/20/09- 10/26/09	NOEC= 100% S (TU <sub>c</sub> = 1.0) <b>NOEC= 8% R</b> (TU <sub>c</sub> = 12.5)	100%	Biological Monitoring Inc.
4 <sup>th</sup> Annual	10/26/10- 11/2/10	NOEC= 54% S (TU <sub>c</sub> = 1.85) <b>NOEC= 8% R</b> (TU <sub>c</sub> = 12.5)	50%	Biological Monitoring Inc.
5 <sup>th</sup> Annual	10/25/11- 10/31/11	NOEC = 100% S (TU <sub>c</sub> = 1.0) <b>NOEC = 50% R</b> (TU <sub>c</sub> = 2.0)	100%	Biological Monitoring Inc.

S= survival, R = reproduction

Note: The bold NOEC result is the lowest NOEC of the test pair and represents the test endpoint.

Table 3. Historical Chronic Toxicity Test Data for *C. dubia*

TEST DATE	TEST RESULT	% SURVIVAL IN 100% EFFLUENT (6-7 day)	TEST Lab
8/31/99-9/7/99	NOEC= 100% S (TU <sub>c</sub> = 1.0) <b>NOEC= 52.5% R</b> (TU <sub>c</sub> = 1.9)	50%	Biological Monitoring Inc.
8/15/00- 8/21/00	<b>NOEC= 10.5% S,R</b> (TU <sub>c</sub> = 9.5)	0%	Biological Monitoring Inc.
8/28/01-9/4/01	NOEC= 100% S,R (TU <sub>c</sub> = 1.0)	90%	Biological Monitoring Inc.
10/22/02- 10/28/02	NOEC= 100% S,R (TU <sub>c</sub> = 1.0)	100%	Biological Monitoring Inc.
1/6/04- 1/13/04	NOEC= 100% S,R (TU <sub>c</sub> = 1.0)	100%	Biological Monitoring Inc.
9/22/05- 9/29/05	NOEC= 100% S,R (TU <sub>c</sub> = 1.0)	80%	Biological Monitoring Inc.
12/7/06- 12/13/06	NOEC= 100% S (TU <sub>c</sub> = 1.0) <b>NOEC= 9% R</b> (TU <sub>c</sub> = 11.11)	100%	Biological Monitoring Inc.

S= survival, R = reproduction

Note: The bold NOEC result is the lowest NOEC of the test pair and represents the test endpoint.

#### CONCLUSION & RECOMMENDATIONS

The facility has shown a reasonable potential for toxicity as defined in Part I.D (WET Testing) of the 2007 permit. Based on the statistical evaluation, an acute toxicity limit is included in the 2012 draft permit. A four year schedule of compliance is given for the permittee to come into compliance with the limitation. Draft WET special condition language follows.

D. Whole Effluent Toxicity (WET) Testing

1. The Whole Effluent Toxicity limitation of 1.02 TU<sub>a</sub> (LC<sub>50</sub>=98%) in Part I.A. is effective no later than 4 years following the effective date of the permit as described in the Schedule of Compliance in Part I.D.

2. Commencing no later than three (3) months following the effective date of the limit, the permittee shall conduct quarterly acute toxicity tests using 24-hour flow-proportioned composite samples of final effluent from Outfall 001 in accordance with the schedule in Part I.C.4. The acute tests to use are:

48 Hour Static Acute test using *Ceriodaphnia dubia*

48-Hour Static Acute test using *Pimephales promelas*

These acute tests shall be performed with a minimum of 5 dilutions, derived geometrically, for calculation of a valid LC<sub>50</sub> and corresponding acute Toxic Units (TU<sub>a</sub>). Express as TU<sub>a</sub> (Acute Toxic Units) by dividing 100/LC<sub>50</sub> for DMR reporting. Two copies of the toxicity test results shall be submitted with the DMR. Test procedures and reporting shall be in accordance with the WET testing methods cited in 40 CFR 136.3.

3. The permit may be modified or revoked and reissued to include pollutant specific limits in lieu of a WET limit should it be demonstrated that toxicity is due to specific parameters. The pollutant specific limits must control the toxicity of the effluent.

4. Reporting Schedule

The permittee shall submit the toxicity test reports with the DMR for the tests specified in accordance with the following schedule:

Period	Compliance Period*	DMR/Report Due Date
1 <sup>st</sup> Quarter	Jun-Aug 2016	10 <sup>th</sup> of the month immediately following each compliance period.
2 <sup>nd</sup> Quarter	Sep-Nov 2016	
3 <sup>rd</sup> Quarter	Dec-Feb 2017	
4 <sup>th</sup> Quarter	Mar-May 2017	

\*Note: dates in permit may differ slightly depending on the date of reissuance and the effective date of the permit.

## VA0020346 Emporia WWTP Toxicity Stats Results

Facility = Emporia WWTP  
Chemical = **Toxicity C. dubia** (including historical data)  
Chronic averaging period = 4  
WLAa = 10.2  
WLAc = 9  
Q.L. = 1  
# samples/mo. = 1  
# samples/wk. = 1

### Summary of Statistics:

# observations = 12  
Expected Value = 6.28188  
Variance = 122.731  
C.V. = 1.763553  
97th percentile daily values = 28.9983  
97th percentile 4 day average = 19.6224  
97th percentile 30 day average = 10.0864  
# < Q.L. = 0  
Model used = lognormal

A limit is needed based on Acute Toxicity  
Maximum Daily Limit = 10.2  
Average Weekly limit = 10.2  
Average Monthly Limit = 10.2

### The data are:

1  
12.5  
12.5  
12.5  
2  
1.9  
9.5  
1  
1  
1  
1  
11.11

Facility = Emporia WWTP  
Chemical = **Toxicity C. dubia** (2007 permit data only)  
Chronic averaging period = 4  
WLAa = 10.2  
WLAc = 9  
Q.L. = 1  
# samples/mo. = 1  
# samples/wk. = 1

### Summary of Statistics:

# observations = 5  
Expected Value = 8.1  
Variance = 23.6196  
C.V. = 0.6  
97th percentile daily values = 19.7106  
97th percentile 4 day average = 13.4767  
97th percentile 30 day average = 9.76903  
# < Q.L. = 0  
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity  
Maximum Daily Limit = 10.2  
Average Weekly limit = 10.2  
Average Monthly Limit = 10.2

### The data are:

1  
12.5  
12.5  
12.5  
2

Facility = Emporia WWTP  
Chemical = **Toxicity P.promelas**  
Chronic averaging period = 4  
WLAa = 10.24  
WLAc = 9  
Q.L. = 1  
# samples/mo. = 1  
# samples/wk. = 1

Summary of Statistics:

# observations = 4  
Expected Value = 1  
Variance = .36  
C.V. = 0.6  
97th percentile daily values = 2.43341  
97th percentile 4 day average = 1.66379  
97th percentile 30 day average= 1.20605  
# < Q.L. = 0  
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

1  
1  
1  
1



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O		
1	<b>Spreadsheet for determination of WET test endpoints or WET limits</b>																
2																	
3																	
4	<b>Excel 97</b>			<b>Acute Endpoint/Permit Limit</b>			<b>Use as LC<sub>50</sub> in Special Condition, as TUA on DMR</b>										
5	<b>Revision Date: 01/10/05</b>																
6	<b>File: WETLIM10.xls</b>			<b>ACUTE</b>			<b>1.024514025</b>	<b>TU<sub>a</sub></b>	<b>LC<sub>50</sub> =</b>		<b>98</b>	<b>% Use as</b>	<b>1.02</b>	<b>TU<sub>a</sub></b>			
7	<b>(MIX.EXE required also)</b>			<b>ACUTE WLA<sub>a</sub></b>			<b>1.024514</b>	Note: Inform the permittee that if the mean of the data exceeds this TUA: <b>1.0</b>								a limit may result using WLA.EXE	
8																	
9																	
10																	
11				<b>Chronic Endpoint/Permit Limit</b>			<b>Use as NOEC in Special Condition, as TUC on DMR</b>										
12																	
13				<b>CHRONIC</b>			<b>10.24514025</b>	<b>TU<sub>c</sub></b>	<b>NOEC =</b>		<b>10</b>	<b>% Use as</b>	<b>10.00</b>	<b>TU<sub>c</sub></b>			
14				<b>BOTH*</b>			<b>10.24514025</b>	<b>TU<sub>c</sub></b>	<b>NOEC =</b>		<b>10</b>	<b>% Use as</b>	<b>10.00</b>	<b>TU<sub>c</sub></b>			
15	<b>Enter data in the cells with blue type:</b>			<b>AML</b>			<b>10.24514025</b>	<b>TU<sub>c</sub></b>	<b>NOEC =</b>		<b>10</b>	<b>% Use as</b>	<b>10.00</b>	<b>TU<sub>c</sub></b>			
16																	
17	Entry Date:			02/13/12			<b>ACUTE WLA<sub>a,c</sub></b>			<b>10.24514</b>	Note: Inform the permittee that if the mean of the data exceeds this TUC: <b>4.21018579</b>						
18	Facility Name:			Emporia WWTP			<b>CHRONIC WLA<sub>c</sub></b>			<b>9</b>							
19	VPDES Number:			VA0020346			* Both means acute expressed as chronic										
20	Outfall Number:			1													
21																	
22	Plant Flow:			1.5 MGD			<b>% Flow to be used from MIX.EXE</b>			<b>Difuser /modeling study?</b>							
23	Acute 1Q10:			4.9 MGD			73.93 %			Enter Y/N <b>N</b>							
24	Chronic 7Q10:			12 MGD			100 %			Acute 1 : 1							
25										Chronic 1 : 1							
26	Are data available to calculate CV? (Y/N)			N			(Minimum of 10 data points, same species, needed)						Go to Page 2				
27	Are data available to calculate ACR? (Y/N)			N			(NOEC<LC50, do not use greater/less than data)						Go to Page 3				
28																	
29																	
30	IWC <sub>a</sub>			29.28217672 %			Plant flow/plant flow + 1Q10			<b>NOTE: If the IWC<sub>a</sub> is &gt;33%, specify the NOAEC = 100% test/endpoint for use</b>							
31	IWC <sub>c</sub>			11.11111111 %			Plant flow/plant flow + 7Q10										
32																	
33	Dilution, acute			3.415046667			100/IWC <sub>a</sub>										
34	Dilution, chronic			9			100/IWC <sub>c</sub>										
35																	
36	WLA <sub>a</sub>			1.024514			Instream criterion (0.3 TUA) X's Dilution, acute										
37	WLA <sub>c</sub>			9			Instream criterion (1.0 TUC) X's Dilution, chronic										
38	WLA <sub>a,c</sub>			10.24514			ACR X's WLA <sub>a</sub> - converts acute WLA to chronic units										
39																	
40	ACR -acute/chronic ratio			10			LC50/NOEC (Default is 10 - if data are available, use tables Page 3)										
41	CV-Coefficient of variation			0.6			Default of 0.6 - if data are available, use tables Page 2)										
42	Constants eA			0.4109447			Default = 0.41										
43	eB			0.6010373			Default = 0.60										
44	eC			2.4334175			Default = 2.43										
45	eD			2.4334175			Default = 2.43 (1 samp)										
46																	
47	LTA <sub>a,c</sub>			4.210185984			WLA <sub>a,c</sub> X's eA			**The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTA <sub>a,c</sub> and MDL using it are driven by the ACR.							
48	LTA <sub>c</sub>			5.4093357			WLA <sub>c</sub> X's eB										
49	MDL** with LTA <sub>a,c</sub>			10.24514025			TU <sub>c</sub>			NOEC =			9.760725	(Protects from acute/chronic toxicity)	Rounded NOEC's	%	
50	MDL** with LTA <sub>c</sub>			13.16317216			TU <sub>c</sub>			NOEC =			7.596953	(Protects from chronic toxicity)	NOEC =	8 %	
51	AML with lowest LTA			10.24514025			TU <sub>c</sub>			NOEC =			9.760725	Lowest LTA X's eD	NOEC =	10	
52																	
53	<b>IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU<sub>c</sub> to TU<sub>a</sub></b>																
54																	
55	MDL with LTA <sub>a,c</sub>			1.024514025			TU <sub>a</sub>			LC50 =			97.607253	%	Rounded LC50's	%	
56	MDL with LTA <sub>c</sub>			1.316317216			TU <sub>a</sub>			LC50 =			75.969530	%	LC50 =	98 %	
57																	
58																	





	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
110															
111	<b>Page 3 - Follow directions to develop a site specific ACR (Acute to Chronic Ratio)</b>														
112															
113	To determine Acute/Chronic Ratio (ACR), insert usable data below. Usable data is defined as valid paired test results,														
114	acute and chronic, tested at the same temperature, same species. The chronic NOEC must be less than the acute														
115	LC <sub>50</sub> , since the ACR divides the LC <sub>50</sub> by the NOEC. LC <sub>50</sub> 's >100% should not be used.														
116															
117	<b>Table 1. ACR using Vertebrate data</b>														
118															
119															
120	<b>Set #</b>	<b>LC<sub>50</sub></b>	<b>NOEC</b>	<b>Test ACR</b>	<b>Logarithm</b>	<b>Geomean</b>	<b>Antilog</b>	<b>ACR to Use</b>							
121	1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
122	2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
123	3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
124	4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
125	5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
126	6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
127	7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
128	8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
129	9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
130	10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
131															
132	ACR for vertebrate data:								0						
133															
134	Table 1. Result:				Vertebrate ACR				0						
135	Table 2. Result:				Invertebrate ACR				0						
136					Lowest ACR				Default to 10						
137															
138	<b>Table 2. ACR using Invertebrate data</b>														
139															
140															
141	<b>Set #</b>	<b>LC<sub>50</sub></b>	<b>NOEC</b>	<b>Test ACR</b>	<b>Logarithm</b>	<b>Geomean</b>	<b>Antilog</b>	<b>ACR to Use</b>							
142	1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
143	2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
144	3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
145	4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
146	5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
147	6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
148	7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
149	8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
150	9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
151	10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA							
152															
153	ACR for vertebrate data:								0						
154															
155															
156															
157	<b>DILUTION SERIES TO RECOMMEND</b>														
158	<b>Table 4.</b>				<b>Monitoring</b>		<b>Limit</b>								
159					<b>% Effluent</b>		<b>TUc</b>								
160	Dilution series based on data mean				23.8		4.210186								
161	Dilution series to use for limit				10		10								
162	Dilution factor to recommend:				0.4873594		0.3162278								
163															
164	Dilution series to recommend:				100.0		1.00								
165					48.7		2.05								
166					23.8		4.21								
167					11.6		8.64								
168					5.64		17.73								
169	Extra dilutions if needed				2.75		36.37								
170					1.34		74.63								
171															
172															

<b>Convert LC<sub>50</sub>'s and NOEC's to Chronic TU's</b>			
<b>for use in WLA.EXE</b>			
<b>Table 3.</b>		<b>ACR used: 10</b>	
	<b>Enter LC<sub>50</sub></b>	<b>TUc</b>	<b>Enter NOEC</b>
			<b>TUc</b>
1	NO DATA		NO DATA
2	NO DATA		NO DATA
3	NO DATA		NO DATA
4	NO DATA		NO DATA
5	NO DATA		NO DATA
6	NO DATA		NO DATA
7	NO DATA		NO DATA
8	NO DATA		NO DATA
9	NO DATA		NO DATA
10	NO DATA		NO DATA
11	NO DATA		NO DATA
12	NO DATA		NO DATA
13	NO DATA		NO DATA
14	NO DATA		NO DATA
15	NO DATA		NO DATA
16	NO DATA		NO DATA
17	NO DATA		NO DATA
18	NO DATA		NO DATA
19	NO DATA		NO DATA
20	NO DATA		NO DATA

If WLA.EXE determines that an acute limit is needed, you need to convert the TUc answer you get to TUa and then an LC50,  
enter it here: 10.245 97.61 %LC<sub>50</sub>  
1.0245 TUa

**Cell:** I9  
**Comment:** This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

**Cell:** K18  
**Comment:** This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

**Cell:** J22  
**Comment:** Remember to change the "N" to "Y" if you have ratios entered, otherwise, they won't be used in the calculations.

**Cell:** C40  
**Comment:** If you have entered data to calculate an ACR on page 3, and this is still defaulted to "10", make sure you have selected "Y" in cell E21

**Cell:** C41  
**Comment:** If you have entered data to calculate an effluent specific CV on page 2, and this is still defaulted to "0.6", make sure you have selected "Y" in cell E20

**Cell:** L48  
**Comment:** See Row 151 for the appropriate dilution series to use for these NOEC's

**Cell:** G62  
**Comment:** Vertebrates are:  
Pimephales promelas  
Oncorhynchus mykiss  
Cyprinodon variegatus

**Cell:** J62  
**Comment:** Invertebrates are:  
Ceriodaphnia dubia  
Mysidopsis bahia

**Cell:** C117  
**Comment:** Vertebrates are:  
Pimephales promelas  
Cyprinodon variegatus

**Cell:** M119  
**Comment:** The ACR has been picked up from cell C34 on Page 1. If you have paired data to calculate an ACR, enter it in the tables to the left, and make sure you have a "Y" in cell E21 on Page 1. Otherwise, the default of 10 will be used to convert your acute data.

**Cell:** M121  
**Comment:** If you are only concerned with acute data, you can enter it in the NOEC column for conversion and the number calculated will be equivalent to the TUA. The calculation is the same:  $100/\text{NOEC} = \text{TUc}$  or  $100/\text{LC50} = \text{TUA}$ .

**Cell:** C138  
**Comment:** Invertebrates are:  
Ceriodaphnia dubia  
Mysidopsis bahia

## **Attachment M: No Exposure Certification**



# COMMONWEALTH of VIRGINIA

## DEPARTMENT OF ENVIRONMENTAL QUALITY

PIEDMONT REGIONAL OFFICE

4949-A Cox Road, Glen Allen, Virginia 23060

(804) 527-5020 Fax (804) 527-5106

[www.deq.virginia.gov](http://www.deq.virginia.gov)

Douglas W. Domenech  
Secretary of Natural Resources

David K. Paylor  
Director

Michael P. Murphy  
Regional Director

March 16, 2012

Brian Thrower, City Manager  
City of Emporia Virginia  
201 South Main Stree  
Emporia, VA 23847

RE: No Exposure Certification for City of Emporia Wastewater Treatment Facility  
500 Tall Oaks, Emporia VA 23847

Dear Applicant:

Please find enclosed a copy of the completed Virginia Department of Environmental Quality (DEQ) No Exposure Certification for Exclusion from Virginia Pollutant Discharge Elimination System (VPDES) Storm Water Permitting in response to your submittal received November 21, 2011. This certification constitutes notice that permit authorization is not required for storm water discharges associated with industrial activity under the VPDES Permit Program due to the existence of a condition of "No Exposure" at the above referenced facility.

In accordance with the VPDES Permit Regulation (9VAC 25-31-120.E), to maintain eligibility for continued exclusion, you must submit a signed certification to DEQ no less frequently than once every five years. Consequently, this Certification is effective through November 20, 2016, provided the condition of no exposure continues to exist at this facility.

Should site conditions change and industrial activities or materials become exposed to precipitation that may result in a storm water discharge to waters of the Commonwealth, authorization under an individual or general VPDES permit may be required.

If you have any questions, please feel free to call Jeremy Kazio at (804) 527-5044 or email at [Jeremy.Kazio@deq.virginia.gov](mailto:Jeremy.Kazio@deq.virginia.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "Curtis J. Linderman".

Curtis J. Linderman, P.E.  
Water Permit Manager

Enclosure